

**DESCRIPTION****METHODS AND COMPOSITIONS FOR INCREASING THE EFFICACY OF  
BIOLOGICALLY-ACTIVE INGREDIENTS****BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention relates generally to the fields of cellular biology. More particularly, it concerns methods and compositions for the modulation of cellular sensitivity to biologically-active agents.

**2. Description of Related Art****Transport Processes**

Cells can use a phenomenon called symport to move soluble products across biological membranes. Symport is a form of coupled movement of two solutes in the same direction across a membrane by a single carrier. Examples of proton and sodium-linked symport systems are found in nearly all living systems. The energetics of the transport event depend on the relative size and electrical nature of the gradient of solutes.

Transport processes have been classified on the basis of their energy-coupling mechanisms. Currently there are four classifications: (1) Primary Active Transport which uses either a chemical, light or electrical energy source, (2) Group Translocation which uses chemical energy sources, (3) Secondary Active Transport which uses either a sodium or proton electrochemical gradient energy source, and (4) Facilitated Diffusion which does not require an energy source (Meyers, 1997). The present invention is related to transport molecules belonging to the first class of transport processes, primary active transport, and therefore, this type of transport will be discussed in further detail.

Primary active transport refers to a process whereby a "primary" source of energy is used to drive the active accumulation of a solute into or extrusion of a solute from a cell. Transport proteins include P-type ATPases and ABC-type ATPases, as well as V-type and E-type ATPases. These types of transport systems are found in both eukaryotes and prokaryotes. The bacterial ABC-type transporters, which are ATP-driven solute pumps, have eukaryotic counterparts. Additionally, many transmembrane solute transport proteins exhibit a common

structural motif. The proteins in these families consist of units or domains that pass through the membrane six times, each time as an  $\alpha$ -helix. This has led to the suggestion that many transport proteins share a common evolutionary origin, but this is not true of several distinct families of transport proteins.

5        Numerous structurally distinct bacterial permeases, as well as several homologous eukaryotic transport systems, share a common organization (Meyers, 1997). Two hydrophilic domains or proteins function to couple ATP hydrolysis in the cytoplasm to activate substrate uptake or efflux, and two hydrophobic domains or proteins function as the transmembrane substrate channels. These proteins or protein domains constitute what is referred to as the ABC  
0        (ATP-binding cassette) superfamily. Either the two hydrophilic domains or proteins or the two hydrophobic domains or proteins (or both) may exist either as heterodimers or homodimers. If, as in most bacterial systems, each of these constituents is a distinct protein, then either two, three, or four genes will code for them, depending on whether both are homodimers, one is a homodimer and one is a heterodimer, or both are heterodimers, respectively. The best  
5        characterized of the eukaryotic proteins included in this family are the multidrug-resistance (MDR) transporter and the cystic fibrosis related chloride ion channel of mammalian cells (cystic fibrosis transmembrane conductance regulator or CFTR) (Meyers, 1997).

### Multidrug Resistance

10        Multidrug resistance (MDR) is a general term that refers to the phenotype of cells or microorganisms that exhibit resistance to different, chemically dissimilar, cytotoxic compounds. MDR can develop after sequential or simultaneous exposure to various drugs. MDR can also develop before exposure to many compounds to which a cell or microorganism may be found to be resistant. MDR which develops before exposure is frequently due to a genetic event which causes the altered expression and/or mutation of an ATP-binding cassette (ABC) transporter  
25        (Wadkins and Roepe, 1997). This is true for both eukaryotes and prokaryotes.

One prominent member of the ABC family, P-glycoprotein (Pgp; also known as multidrug resistance protein or MDR1), which is a plasma-membrane glycoprotein that confers a multidrug resistance (MDR) phenotype on cells, is of considerable interest because it provides one mechanism of possibly inhibiting resistance in tumor cells to chemotherapeutic agents  
30        (Senior *et al.*, 1995). Pgp is a single polypeptide of ~1280 amino acids with the typical ABC transporter structure profile. Studies have shown that over expression of Pgp is responsible for

the ATP-dependent extrusion of a variety of compounds, including chemotherapeutic drugs, from cells (Abraham *et al.*, 1993).

Over one-hundred ABC transporters have been identified in species ranging from *Escherichia coli* to humans (Higgins, 1995). For example, the bacteria *Lactococcus lactis* expresses an ABC transporter, LmrA, which mediates antibiotic resistance by extruding amphiphilic compounds from the inner leaflet of the cytoplasmic membrane (Van Veen *et al.*, 1998). Furthermore, over-expression of LmrA can confer MDR in human lung fibroblasts and LmrA has similar molecular and biochemical properties to Pgp. This demonstrates that bacterial LmrA and Pgp are functionally interchangeable. Additionally, the plant *Arabidopsis thaliana* encodes an ATP transporter, AtPGP-1, which is a putative Pgp homolog (Dudler and Hertig, 1992). Similarly, the yeast *Saccharomyces cerevisiae* equivalent of Pgp, STS1 (Bissinger and Kucher, 1994) has been cloned and shown to confer multidrug resistance when over-expressed in yeast, as has the yeast Pdr5p (Kolaczkowski *et al.*, 1996). Taken together, these results suggest that this type of multidrug resistance efflux pump is conserved from bacteria to humans.

While various theories of ABC transporter function have become popular, there is still no precise molecular-level description for the mechanism by which over-expression lowers intracellular accumulation of drugs, in particular how Pgp lowers intracellular accumulation of chemotherapeutic drugs. However, it has been shown that Pgp over-expression also changes plasma membrane electrical potential and intracellular pH which could potentially greatly affect the cellular flux of a large number of compounds to which Pgp confers resistance (Wadkins and Roepe, 1997). Also included in the ABC transporter superfamily are the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) and the Sulfonyl Urea Receptor (SUR). CFTR and SUR are expressed in the lung epithelium and the  $\beta$  cells of the pancreas, respectively, as well as in other tissues. CFTR functions as a low conductance ATP and cyclic AMP-dependent  $\text{Cl}^-$  channel that also appears to have additional important functions, such as modulation of epithelial  $\text{Na}^+$  regulation of outwardly rectified chloride channels (Wadkins and Roepe, 1997).

Mutations in the CFTR gene produce altered CFTR proteins with defects in CFTR function, leading to profound alterations in epithelial salt transport and altered mucous properties in cystic fibrosis patients that result in chronic lung infections associated with the disease. *Id.* SUR is triggered by sulfonyl urea drugs to depolarize pancreatic P cells that leads to  $\text{Ca}^{2+}$  influx, which stimulates fusion of insulin containing vesicles to the plasma membrane. *Id.* An ATP

transporter hypothesis has been suggested for Pgp, CFTR and SUR which theorizes that these ABC transporters function as ATP transport channels (Abraham *et al.*, 1993; Schweibert, 1995; Al-Awgati, 1995). The ATP channel hypothesis, however, has been viewed with skepticism. This is partly due to the inability to show the same results with preparations including purified  
5 and reconstituted CFTR, suggesting that the ATP conductance that was originally observed may have been mediated by another protein, not present in the purified system, that is influenced by CFTR (Wadkins and Roepe). There has been no such negative data reported with respect to the ATP channel hypothesis for Pgp or SUR, but the controversy over CFTR has raised doubt for Pgp and SUR as well.

10 In support of the ATP channel hypothesis (Huang *et al.*, 1992) have suggested that extracellular ATP leads to elevations in pH, and Weiner *et al.*, (1986) have suggested that extracellular ATP may regulate  $\text{Na}^+/\text{H}^+$  exchange in Ehrlich ascites tumor cells. It has also been observed that changes in Pgp levels affects pH and plasma membrane electrical potentials which could be connected to recent observations suggesting the involvement of ATP transport in MDR.

15 Additionally, Abraham *et al.*, (1993) have reported that the addition of extracellular ATP to MDR cell lines confers sensitivity to drugs abolishing MDR. The data for this effect were not presented in the article and no further explanation was given for this phenomenon. Furthermore, there have been no subsequent publications addressing or explaining this effect.

20 Furthermore, Ujhazy *et al.*, (1996) have shown that ecto-5'-nucleotidase is up-regulated in certain MDR cell lines. Ecto-5'-nucleotidase is the final enzyme in the extracellular pathway for salvage of adenosine from phosphorylated purines (Zimmerman, 1992). The proposed hypothesis for the involvement of ecto-5'-nucleotidase in drug resistance considers its role in the maintenance of intracellular ATP pools through the adenosine salvage pathway (Ujhazy *et al.*, 1996). Ecto-5'-nucleotidase specifically acts in adenosine salvage pathways, converting AMP to  
25 adenosine which is more readily taken up by the cell and utilized as a precursor for ATP production. Therefore, ecto-5'-nucleotidase may be acting in certain MDR cell lines as a mechanism by which the cell circumvents the loss of ATP (due to up-regulated transport proteins which possibly form ATP transport channels) by creating higher levels of adenosine from which the cell can produce ATP. Correspondingly, 63% of MDR cell line variants tested expressed  
30 ecto-5'- nucleotidase. These observations suggested that a salvage mechanism for extracellular nucleotides may be another way by which certain MDR cells counterbalance their ATP losses



from efflux induced by the over-expression of ABC transporters involved in MMR. Consistent with this hypothesis, inhibitors of ecto-5'-nucleotidase conferred sensitivity to certain drugs in MDR cell lines which over-express the ecto-5'-nucleotidase.

5 It is also interesting to note that yeast, which do not have an adenosine salvage pathway (Boyum and Guidotti, 1997), do contain a PGP-like gene called STS 1 (Bissinger and Kucher, 1994). Therefore, since the adenosine salvage pathway is unlikely to be involved in yeast multidrug resistance, other mechanisms are likely to exist.

Recent reports have confirmed the existence of ATP in the extracellular matrix (ECM) of both multicellular organisms and unicellular organisms (Sedaa *et al.*, 1990; Boyum and Guidotti, 10 1997), respectively. However, no such reports are available which suggest the existence of ATP in the ECM of plants before the present invention. These reports have prompted further investigations of the fate of ATP outside the cell. One of the largest gradients in biological systems is that of ATP. It is a million-fold more concentrated inside the cell than outside. Phosphatases are enzymes with the ability to hydrolyze ATP and to a lesser extent, the beta 15 phosphate of ADP (Plesner, 1995). Extracellular phosphatases are generally referred to as ectophosphatases. A type of ectophosphatase is ecto-pyrase. Given reports that show the existence of extracellular ATP, one observation regarding ectoaprase is that it hydrolyzes the extracellular ATP. In fact, work in animal systems has shown that apyrases hydrolyze ATP in the ECM as part of the adenosine salvage pathway conjointly with ecto-5' ectonucleotidase (Che, 20 1992).

What has been lacking in the art are particular methods and compositions that allow modification of cellular ATP gradients to increase the uptake of cytotoxic agents by cells. It would be particularly useful to identify methods and compositions that result in increased uptake by cells of herbicides, antibiotics, fungicides, insecticides, chemotherapeutics and other active 25 ingredients. This may result in increased efficacy in the use of such agents, as well as allow use of lower concentrations of such agents. This may provide cost, health and environmental benefits. This may also allow effective treatment of MDR cells, such as antibiotic-resistant bacteria or chemotherapy-resistant tumor cells.

### SUMMARY OF THE INVENTION

In one aspect, the invention provides a cytotoxic composition comprising an ectophosphatase inhibitor and a cytotoxic agent set forth in Table 1. In one embodiment of the invention, the cytotoxic agent is selectively cytotoxic. In other embodiments, the cytotoxic composition may be further defined as a herbicidal composition and the cytotoxic agent a herbicide, may be further defined as an insecticidal composition and the cytotoxic agent an insecticide, may be further defined as a fungicidal composition and the cytotoxic agent a fungicide and/or may be further defined as an antibiotic composition and the cytotoxic agent an antibiotic. In an antibiotic composition, the antibiotic may be from a class selected from the group consisting of Beta-lactam, Semisynthetic penicillin, Clavulanic Acid, Monobactams, Carboxypenems, Aminoglycosides, Glycopeptides, Lincomycins, Macrolides, Polyenes, Rifamycins, Tetracyclines, Semisynthetic, tetracycline and Chloramphenicol. In certain embodiments of the invention, the ectophosphatase inhibitor may be selected from the group consisting of the compounds of formulae I-XX.

In another aspect, the invention provides a plant growth regulator composition comprising an ectophosphatase inhibitor and a plant growth regulator agent set forth in Table 1. In one embodiment of the invention, the ectophosphatase inhibitor is selected from the group consisting of the compounds of formulae I-XX.

In yet another aspect, the invention provides a chemotherapeutic composition comprising an ectophosphatase inhibitory compound and a chemotherapeutic agent. In one embodiment of the invention, the chemotherapeutic agent is a chemotherapeutic agent set forth in Table 3. In further embodiments of the invention, the ectophosphatase inhibitor is selected from the group consisting of the compounds of formulae I-XX.

In still yet another aspect, the invention provides a method of killing or inhibiting the growth of a plant, comprising contacting said plant with an effective amount of a herbicidal composition provided by the invention. The method may be carried out with potentially any plant, including a monocotyledonous plant or a dicotyledonous plant.

In still yet another aspect, the invention provides a method of killing or inhibiting the growth of a tumor cell, comprising contacting said tumor cell with an effective amount of a chemotherapeutic composition of the invention. In the method, contacting may comprise

administering the composition to a patient in need thereof, wherein the patient comprises the tumor cell.

In still yet another aspect, the invention provides a method of killing or inhibiting the growth of a target cell, comprising contacting said cell with a composition formulated therefore.

5 In certain embodiments of the invention, the cell may be a fungal cell, bacterial cell, or insect cell.

In still yet another aspect, the invention provides a method of increasing the effectiveness of a cytotoxic agent, comprising admixing said cytotoxic agent with an ectophosphatase inhibitor, wherein the cytotoxic agent is selected from the group set forth in Table 1. In certain  
10 embodiments of the invention, the cytotoxic agent may be further defined as a herbicide, insecticide, fungicide, and an antibiotic. Examples of antibiotics include those from the following classes: Beta-lactam, Semisynthetic penicillin, Clavulanic Acid, Monobactams, Carboxypenems, Aminoglycosides, Glycopeptides, Lincomycins, Macrolides, Polyenes, Rifamycins, Tetracyclines, Semisynthetic, tetracycline and Chloramphenicol. In one  
15 embodiment of the invention. In one embodiment of the invention, a cytotoxic agent is a chemotherapeutic agent, for example, selected from the group set forth in Table 3.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The following drawings form part of the present specification and are included to further  
20 demonstrate certain aspects of the present invention. The invention may be better understood by reference to one or more of these drawings in combination with the detailed description of specific embodiments presented herein.

**FIGs. 1A-1C** Expression of apyrase in pea and in transgenic plants (FIG. 1A) Immunoblot analysis of subcellular fractions from etiolated pea plants. (FIG. 1B) Top, the total  
25 phosphate accumulated in the shoots of three independent transgenic plants. Bottom, a corresponding Immunoblot performed on protein from ECM of wild-type and transgenic plants. (FIG. 1C) Assay of phosphatase activity in the ECM fraction of OE1 and wild-type.

**FIGs. 2A-C** Transport of the products of ATP hydrolysis by transgenic plants overexpressing apyrase and by wild-type plants.

**FIGs. 3A-D** Conference of resistance to cycloheximide (FIG. 3A, B) and nigericin (FIG. 3C, D) in wild-type and ectophosphatase deficient yeast over-expressing the *Arabidopsis* plant ABC transporter, AtPGP-1.

**FIGs. 4A-B-3** Conference of resistance to cycloheximide (FIG. 4A) and cytokinin (FIG. 4B-1-FIG. 4B-3) in *Arabidopsis* plants over-expressing either the ectophosphatase, apyrase, or the ABC transporter, AtPGP-1.

**FIGs. 5A-B** Graph showing the growth turbidity of YMR4 yeast over-expressing the *Arabidopsis* plant ABC transporter AtPGP-1 grown in cycloheximide (FIG. 5A) or nigericin (FIG. 5B).

**FIG. 6** Graph showing germination rate of *Arabidopsis* plants grown in the presence of cycloheximide which over-express either the ectophosphatase, apyrase, or the ABC transporter AtPGP-1.

**FIG. 7** Graph of steady-state levels of ATP in the extracellular fluid of wildtype yeast cells grown in the presence or absence of glucose and in the presence or absence of over-expression of the *Arabidopsis* plant ABC transporter, AtPGP-1.

**FIG. 8** Graph showing that over-expression of *Arabidopsis* plant ABC transporter, AtPGP-1, in yeast can double the steady-state levels of ATP in the extracellular fluid.

**FIG. 9** Graph showing that a yeast mutant, YMR4, that has a deficient ectophosphatase, accumulates ATP in the extracellular fluid and the over-expression of AtPGP-1 increases the accumulation of ATP.

**FIG. 10** Graph showing results of a pulse-chase experiment in either wildtype yeast cells or a yeast mutant, YMR4, which is deficient in ectophosphatase activity, in the presence and absence of over-expression of *Arabidopsis* plant ABC transporter, AtPGP-1, demonstrating an early differential ATP efflux of cells over-expressing AtPGP-1.

**FIG. 11** Graph of ATP levels on the surface of leaves of *Arabidopsis* plants over-expressing AtPGP-1 (MDR 1).

**FIG. 12** Effects of phosphatase inhibitor in wild-type and AtPGP-1 (MDR1) overexpressing *Arabidopsis* plants.

**FIG. 13** Growth effects of cycloheximide and extracellular ATP on wildtype and MDR1 overexpressing *S. cerevisiae* yeast cells which have either never seen cycloheximide or which have been previously selected in cycloheximide.

**FIG. 14** Growth effects of cycloheximide, adenosine and phosphate on wildtype and AtPGP-1 overexpressing *S. cerevisiae* yeast cells.

### **DETAILED DESCRIPTION OF THE INVENTION**

The present invention provides methods and compositions for modulating the sensitivity of cells to cytotoxic compounds and other active agents. In accordance with the invention, such modulation may be carried out by modifying cellular ATP gradients, for example, by contacting a plant, animal, yeast or bacterial cell with an ectophosphatase inhibitor contemporaneously with a cytotoxic agent or other active ingredient, or combinations thereof. As used herein, the term “ectophosphatase inhibitor” refers to a compound that has the ability to specifically inhibit ectophosphatase activity. A “cytotoxic agent” is a compound capable of selectively or non-selectively killing or inhibiting the growth of a cell, including antibiotics, fungicides, herbicides, insecticides and chemotherapeutic agents.

The efficacy of one or more cytotoxic agents may be increased in accordance with the invention by reducing the ATP gradient across biological membranes, which is effectuated through the modulation of an ectophosphatase either alone or together with an ABC transporter molecule. Modulation of resistance to a cytotoxic compound as described herein is useful, for example, in increasing the sensitivity of plants to herbicides; reducing drug resistance in tumor cells for improved chemotherapy applications; and reducing resistance to antibiotics, antifungal agents, insecticides and other cytotoxic agents for the treatment of infections and disease. Provided by the invention are specific combinations of ectophosphatase inhibitors and cytotoxic compounds or other active ingredients that may be used in these applications.

In accordance with certain embodiments of the invention, the manipulation of extracellular ATP levels to alter ATP gradient across biological membranes in cells by inhibition of ectophosphatases results in diminishing or removing the ATP gradient that may otherwise prevent access of cytotoxic agents to the cell. In some instances, access may be minimized by

efflux of cytotoxic agents from the cell. This efflux is likely effectuated through the "piggy-back" efflux of drug molecules with ATP, a phenomenon known as symport.

In accordance with the invention, inhibitors of ectophosphatases may be administered contemporaneously with cytotoxic agents, including herbicides, antibiotics, fungicides, insecticides and other active ingredients, as well as chemotherapeutics. By "contemporaneously," it is meant within sufficient temporal proximity that the increased sensitivity of a cell to the relevant cytotoxic agent may be achieved in combination with contacting the cell with the agent. In certain embodiments of the invention, ectophosphatase inhibitors are used as adjuvants with cytotoxic agents, that is, are admixed with one or more cytotoxic agents or other active ingredients.

It is therefore an object of the present invention to provide inhibitors of ectophosphatases in physiological compositions for modulating cell growth and/or survival, including, but not limited to, MDR cells. Such physiological compositions may comprise a small molecule capable of inhibiting an ectophosphatase and a physiologically acceptable carrier or diluent together with a therapeutic agent. As used herein, the term "physiologically acceptable carrier or diluent" means any and all solvents, dispersion media, antibacterial and antifungal agents, microcapsules, liposomes, cationic lipid carriers, isotonic and absorption delaying agents and the like which are not incompatible with the ectophosphatase inhibitors. The use of such media and agents for physiologically active substances is well known in the art. Supplementary active ingredients may also be incorporated into the compositions.

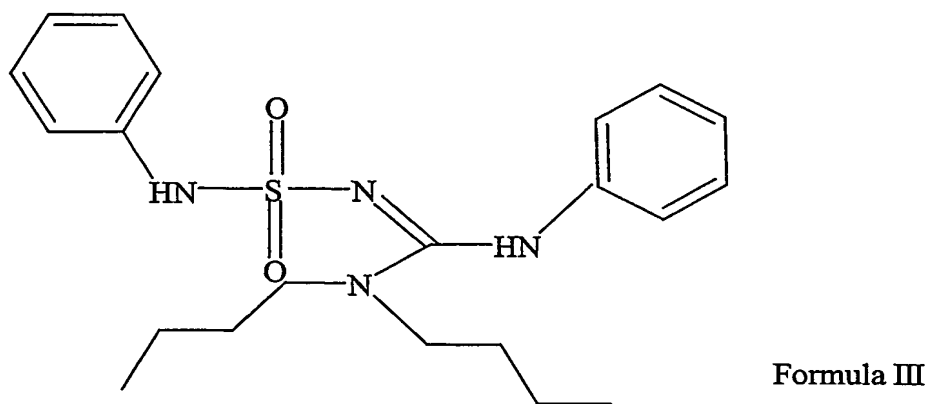
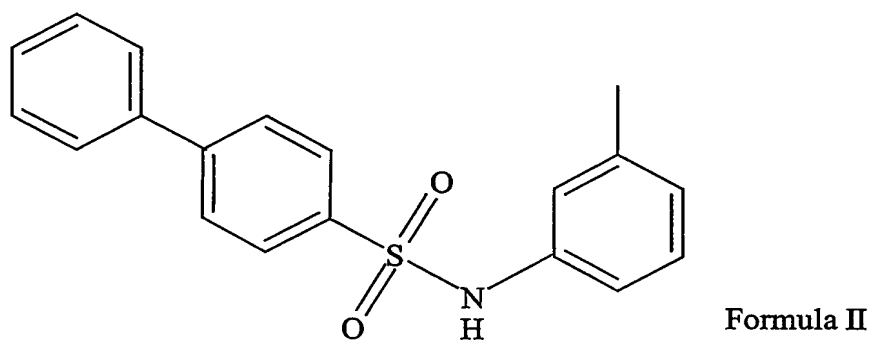
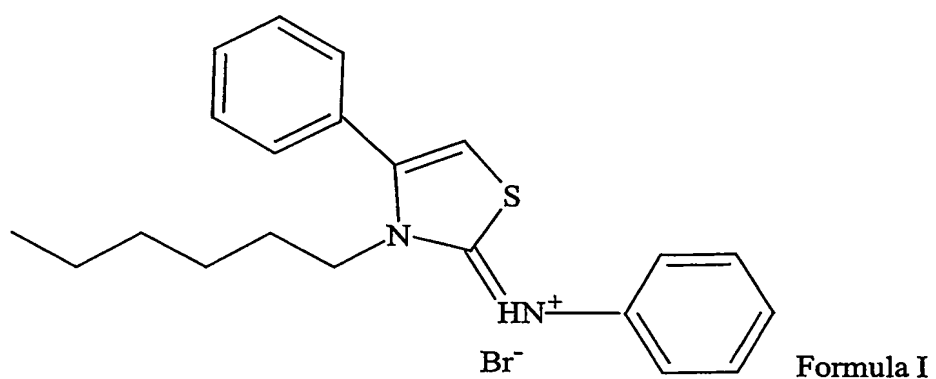
In certain embodiments, only an endogenous ectophosphatase is inhibited. In particular embodiments of the invention, the ectophosphatase is human apyrase. In other embodiments, the ectophosphatase is a plant, bacterial, fungal or yeast ectophosphatase.

The inhibition of ectophosphatases is useful in increasing sensitivity to cytotoxic agents and/or reduction of drug resistance in cells. In one embodiment of the invention, the inhibition of ectophosphatases results in a loss of resistance to a cytotoxic agent. In another embodiment of the invention, administration of such inhibitory molecules is in conjunction with the administration of chemotherapeutic agents in tumor cells.

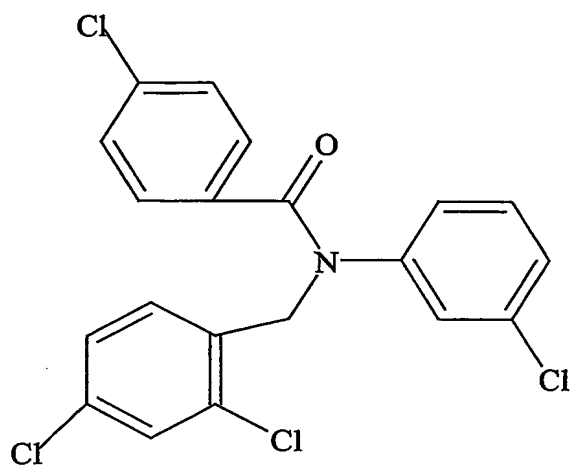
Using high throughput screens, ectophosphatase inhibitors may be isolated, for example, by screening a small molecule library (*e.g.* a combinatorial library) for inhibitory activity to

ectophosphatase (*e.g.* apyrase activity). Once ectophosphatase inhibitory molecules are isolated from such a screen, the inhibitors may be further tested for their ability to specifically inhibit the ATPase activity of the ectophosphatase.

5 Exemplary ectophosphatase inhibitory molecules for use with the current invention are preferably chemically stable and physiologically active including, but not limited to, the compounds of formulae I-XX.

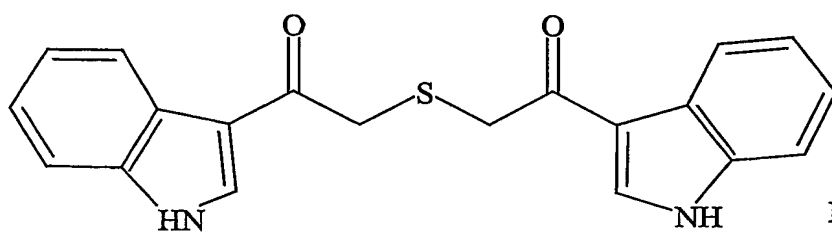




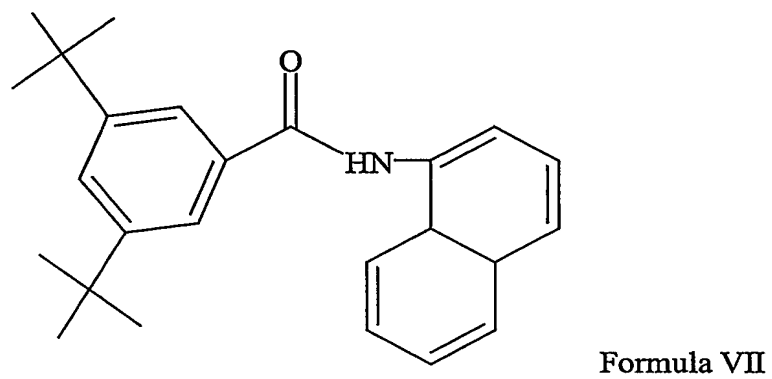
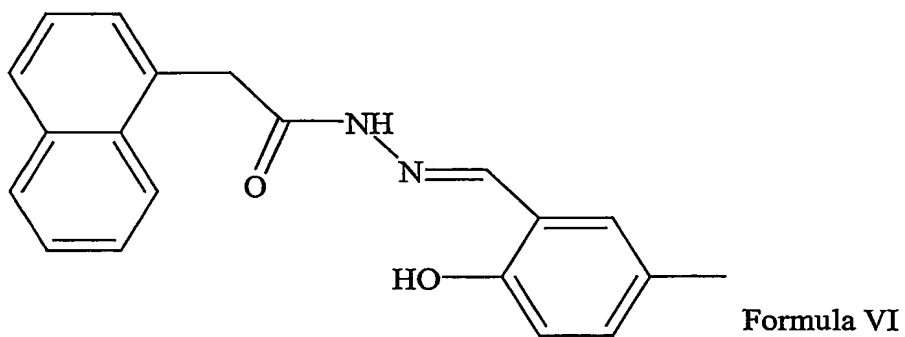


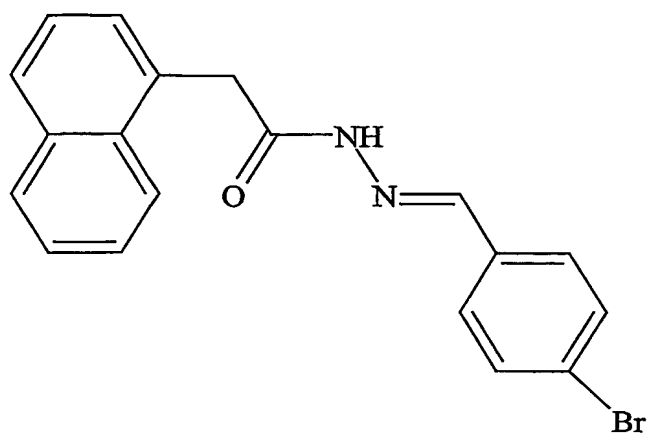
Formula IV

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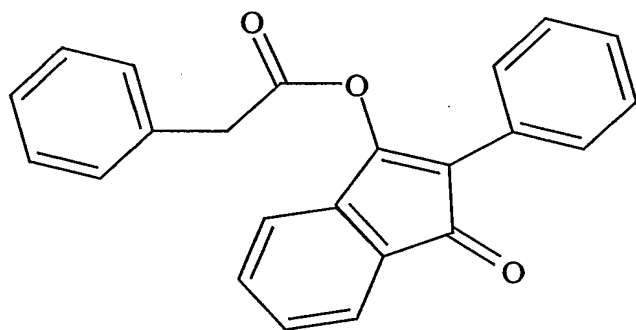


Formula V

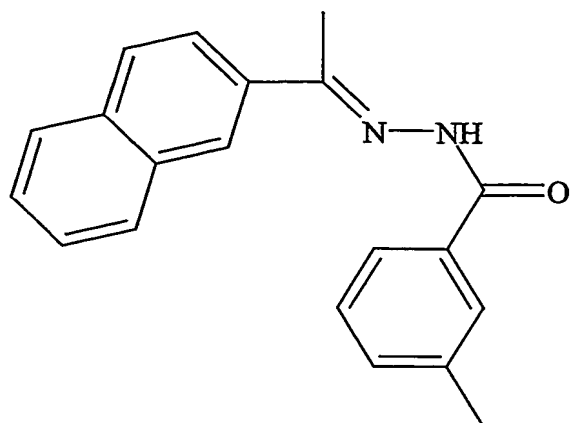




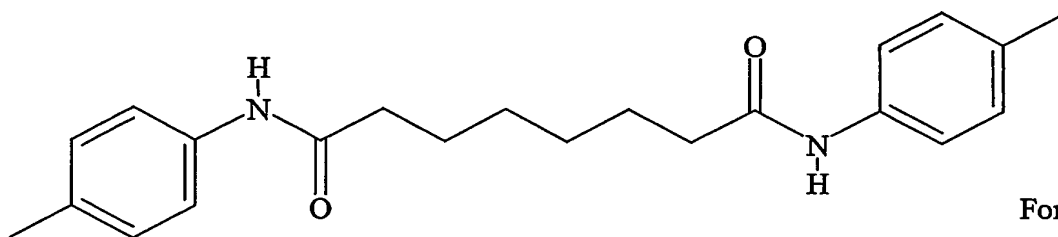
Formula VIII



Formula IX

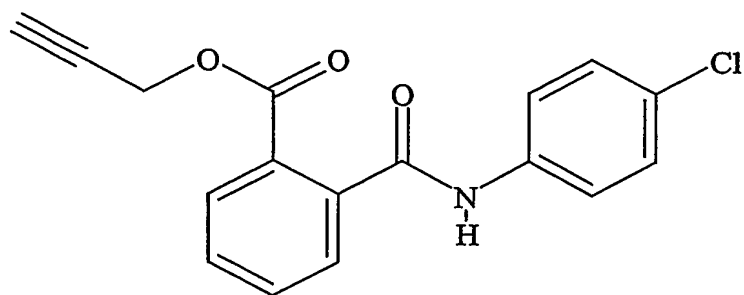


Formula X

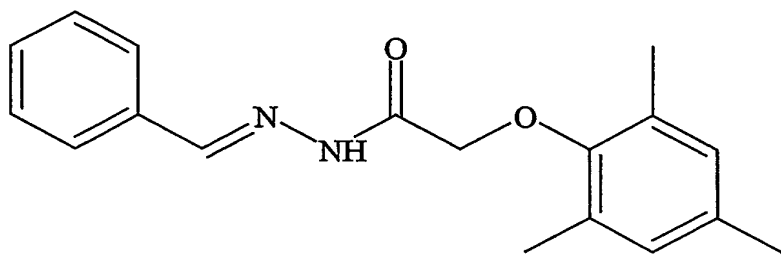


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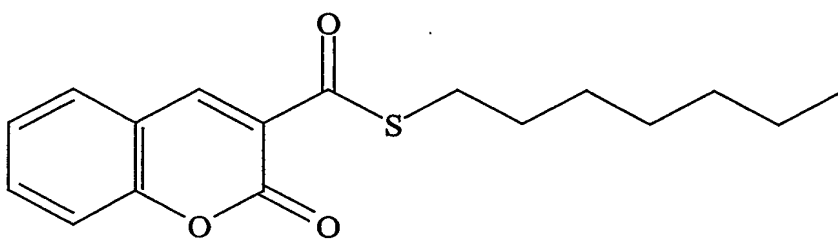
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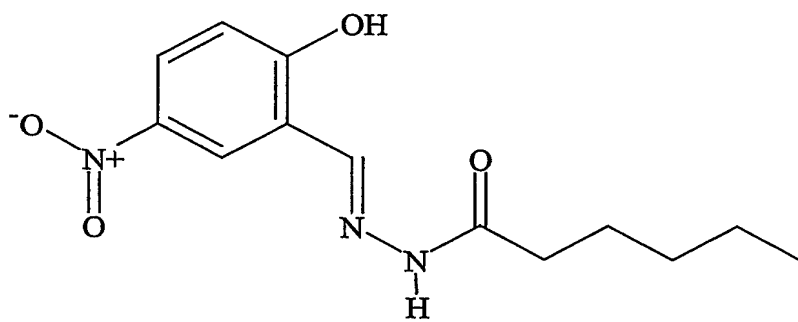
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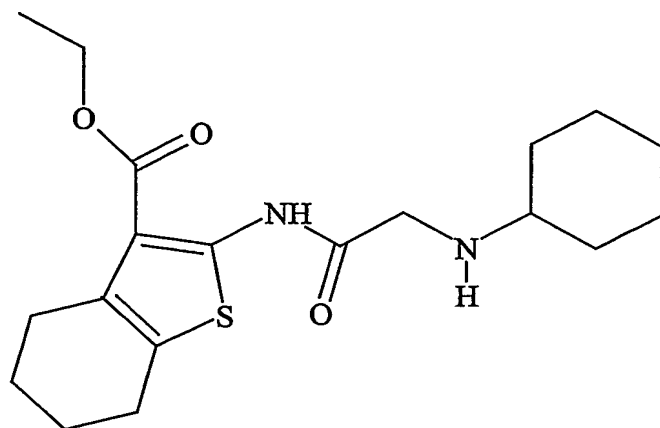
Formula XIII



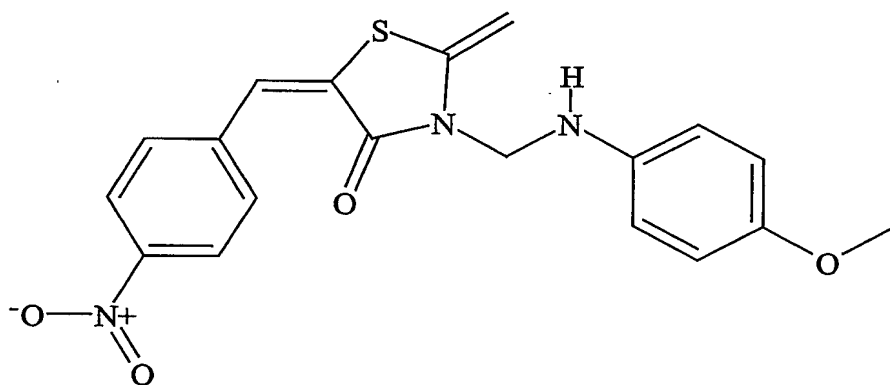
Formula XIV



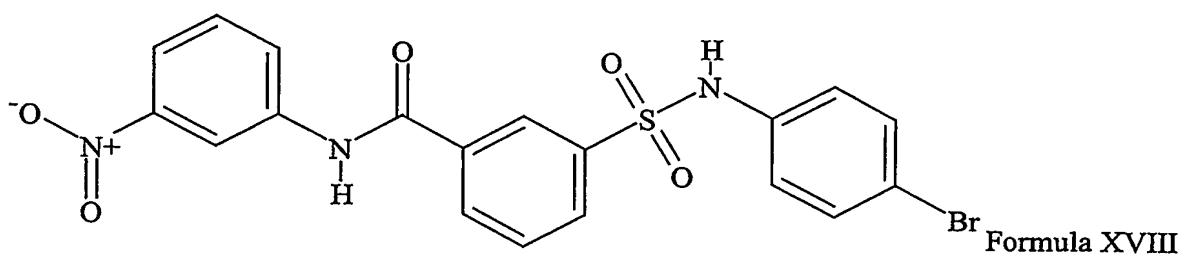
Formula XV



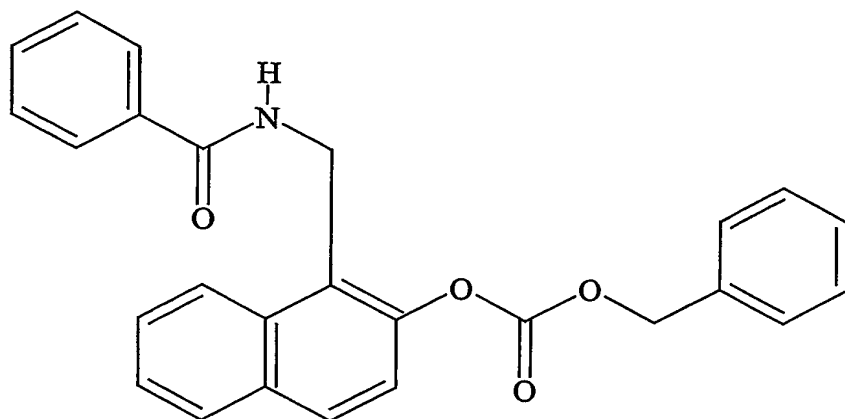
Formula XVI



Formula XVII

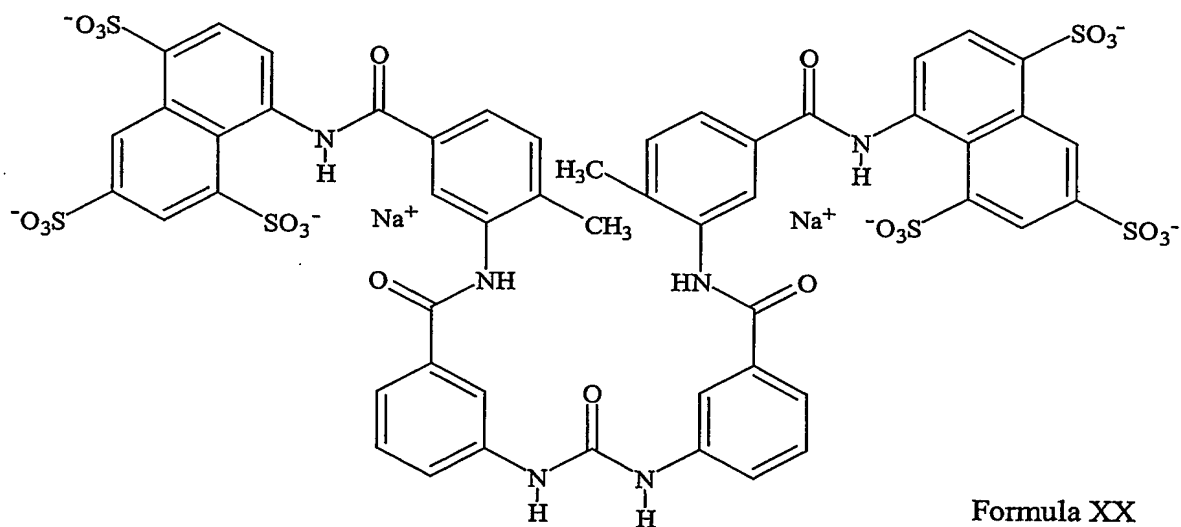


Formula XVIII



Formula XIX

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Formula XX

Preliminary pharmacophore studies revealed that the small molecules represented by Formulae I through XX fall into five classes of compounds (sulfanamides, guanidines,

aminothiazoles, thioketones and benzamides). Most of these chemical classes are found in other physiologically-active compounds, including those having pharmaceutical and therapeutic use. For example, sulfanimides are widely used as antibiotics. Additionally, studies for the isolation of small molecules capable of reversing MDR have described molecules belonging to two of the classes of molecules of the present invention (Medina *et al.* 1998; Dhamant *et al.*, 1992). The molecules described by Medina *et al.* have been shown to affect MDR and the mode of action of the molecules is believed to involve tubulin interactions. The thiazine derivatives described by Dhamant *et al.* reverse the resistance in tumor cells to vincristine.

The ectophosphatase inhibitory molecules are useful in increasing the activities of various agents by increasing the availability of the agents to cells. In certain embodiments of the invention, this may comprise reversing multidrug resistance (MDR) in an organism. In other embodiments, this may be achieved with a cell that does not exhibit MDR. Such cells may or may not comprise an up-regulated ectophosphatase

MDR reversal and/or increasing of sensitivity to a cytotoxic agent in cells may be shown by growing the cells in the presence of relevant drugs and in the presence and absence of the inhibitor. Cells which cannot grow in the presence of a drug in the presence of an ectophosphatase inhibitor, have a reversal in MDR and/or increase in sensitivity to the agent.

The ectophosphatase inhibitory compositions of the present invention are useful in reversing drug resistance in mammalian cell lines grown in the presence of a drug (*e.g.* a chemotherapeutic agent). Analysis of sensitivity to a chemotherapeutic composition in mammalian cells may be shown, for example, by using the fluorescent compound calcein-AM. Esterases present in cells cleave the aceto-methoxy ester (AM) from the calcein-AM and liberate calcein. Calcein is a fluorescent compound which is excitable by the 488 nm laser of a FACS Caliber flow cytometer (Becton Dickinson, Franklin Lakes, N.J.), while the uncleaved calcein-AM is not excitable. Wild type cells incubated in the presence of calcein-AM show a high level of fluorescence while MDR state cells, which efflux the calcein-AM faster than the cellular esterases can cleave it, do not show a high level of fluorescence. The mammalian cells can be tested for the reversal of MDR with ectophosphatase inhibitors by the amount of calcein fluorescence detected in the cells.

Specificity of ectophosphatase inhibitors may be tested with the screening assays described herein. Inhibitors can be tested for their ability to inhibit acid phosphatases, alkaline



phosphatases, myosin phosphatases and the luciferase ATPase. The assays may be performed using techniques known in the art.

In one embodiment of the invention, the ectophosphatase is an apyrase and the ectophosphatase inhibitor is a molecule selected from among molecules represented by the Formulae I through XX. In another embodiment, the ectophosphatase is apyrase and the ectophosphatase inhibitor is a molecule selected from among molecules represented by the Formulae I through V.

In a further embodiment of the invention, the ectophosphatase is apyrase and the ectophosphatase inhibitor is a molecule represented by Formula XX. Formula XX is suramin or 8,8'-(Carboxylbis[imino-3,1-phenylene]carbonylimino(4-methyl-3,1-phenylene)carbonylimino)]bis-1,3,5-naphthalenetrisulfonic acid. Suramin has been reported as a potent non-competitive inhibitor of ectoapyrase activity associated with the plasma membrane of cholinergic nerve terminal of *Torpedo marmorata* electric organs (Marti *et al.*, 1996).

It is contemplated that in certain embodiments of the invention an ectophosphatase inhibitor may inhibit an ectophosphatase active on the outer membrane of an organelle of a eukaryotic cell. In this manner, contacting the cell with the ectophosphatase inhibitor may be used to decrease the ATP gradient across the organelle and thereby facilitate uptake of a biologically active agent by the organelle.

## **I. Formulations**

Ectophosphatase inhibitor compositions, which may be acidic or basic in nature, can form a wide variety of salts with various inorganic and organic bases or acids, respectively. These salts may be physiologically acceptable for *in vivo* administration in mammals, including humans, as well as formulations for *ex vivo* applications, including agricultural use. Salts of acidic compounds are readily prepared by treating the acidic compound with an appropriate molar quantity of the chosen inorganic or organic base in an aqueous or suitable organic solvent and then evaporating the solvent to obtain the salt. Salts of basic compounds can be obtained similarly by treatment with the desired inorganic or organic acid and subsequent solvent evaporation and isolation. The skilled artisan can produce salts of ectophosphatase inhibitors using techniques known in the art.

The skilled artisan readily can determine the amount of the ectophosphatase inhibitor that is required to inhibit ectophosphatase by measuring ATPase activity in the presence and absence of varying amounts of the inhibitor. Phosphatase activity can be determined by assessing the dephosphorylation of ATP and liberation of phosphate as described herein. Additionally, parameters may be measured that are known to be associated with ectophosphatase activity to determine whether the molecule has ectophosphatase inhibitory activity. For example, ectophosphatase inhibitory activity may be measured in cells (*e.g.*, yeast, plant, bacterial, mammalian, and tumor cell lines) by assessing the loss of resistance to drugs. Furthermore, the ectophosphatase inhibitory molecules of the present invention may be tested for specific inhibitory activity to ectophosphatases versus general phosphatases or for specific inhibitory activity for a particular ectophosphatase activity (*e.g.*, apyrase).

The present invention also provides physiologically acceptable compositions comprising an ectophosphatase inhibitor, a cytotoxic agent or other active ingredient and a physiologically acceptable carrier or diluent. In certain embodiments of the invention, as set forth in detail below, compositions are provided comprising one or more ectophosphatase inhibitor and one or more plant growth regulator, herbicide, fungicide, insecticide, antibiotic, chemotherapeutic agent or other active compound. In a further embodiment of the invention, the ectophosphatase is selected from the compounds of formulae I-XX in the appropriate carriers, diluents or other active ingredients.

The use of physiologically acceptable carriers or diluents is well known in the art. The techniques of preparation of pharmaceutical compositions are generally well known in the art as exemplified by Remington's Pharmaceutical Sciences, 16th Ed. Mack Publishing Company, 1980, which reference is specifically incorporated herein by reference in its entirety. Formulations of the present invention may be stable under the conditions of manufacture and storage and must be preserved against contamination by microorganisms.

The physiological forms of the compositions of the invention suitable for administration include sterile aqueous solutions or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions. Typical carriers include a solvent or dispersion medium containing, for example, water buffered aqueous solutions (*i.e.*, biocompatible buffers), ethanol, polyols such as glycerol, propylene glycol, polyethylene glycol,

suitable mixtures thereof, surfactants, and vegetable oils. Isotonic agents such as sugars or sodium chloride may be incorporated into the subject compositions.

Pharmaceutical compositions in accordance with the invention may be used by themselves or in combination with other forms active ingredients or therapeutics. One embodiment of the invention provides formulations for parenteral administration, *e.g.*, formulated for injection via the intravenous, intramuscular, sub-cutaneous or other such routes. Typically, such compositions can be prepared as injectables, either as liquid solutions or suspensions; solid forms suitable for using to prepare solutions or suspensions upon the addition of a liquid prior to injection also can be prepared; and the preparations also can be emulsified.

Solutions of the active compounds as free base or pharmacologically acceptable salts can be prepared in water suitably mixed with a surfactant, such as hydroxypropylcellulose. Dispersions also can be prepared in glycerol, liquid polyethylene glycols, and mixtures thereof and in oils. Under ordinary conditions of storage and use, these preparations contain a preservative to prevent the growth of microorganisms.

The pharmaceutical forms suitable for injectable use include sterile aqueous solutions or dispersions; formulations including sesame oil, peanut oil or aqueous propylene glycol; and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions. In all cases, the form must be sterile and must be fluid to the extent that easy syringability exists. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms, such as bacteria and fungi.

Carriers used also can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), suitable mixtures thereof, and vegetable oils. The proper fluidity can be maintained, for example, by the use of a coating, such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. The prevention of the action of microorganisms can be brought about by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, sorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars or sodium chloride. Prolonged absorption of the injectable compositions can be brought about by the use in the compositions of agents delaying absorption, for example, aluminum monostearate and gelatin.

Sterile injectable solutions are prepared by incorporating the active compounds in the required amount in the appropriate solvent with various of the other ingredients enumerated above, as required, followed by filtered sterilization. Generally, dispersions are prepared by incorporating the various sterilized active ingredients into a sterile vehicle which contains the basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, the preferred methods of preparation are vacuum-drying and freeze-drying techniques which yield a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

Other modes of administration can also find use with the invention. For instance, pharmaceutical compounds may be formulated in suppositories and, in some cases, aerosol and intranasal compositions. For suppositories, the vehicle composition will include traditional binders and carriers such as polyalkylene glycols or triglycerides. Such suppositories may be formed from mixtures containing the active ingredient in the range of about 0.5% to about 10% (w/w), preferably about 1% to about 2%.

Ectophosphatase inhibitors will commonly comprise from less than 1% to about 10% w/v of a composition with an active ingredient, including about 1%, 3%, 5%, & and about 10%. Greater or lesser amounts of the ectophosphatase inhibitors may similarly be used. Desired concentrations may readily be determined by serial preparation and assay of compositions comprising varying amounts of the selected ectophosphatase inhibitor compound. For example, in the case of herbicidal compositions, a series of test compositions comprising from about 0.1% to about 25% w/v of an ectophosphatase inhibitor together with a test herbicide may be analyzed by leaf painting and comparison of the results. Safety, efficacy, cost and other concerns may each be taken into account in selecting the desired concentrations. Alternatively, pharmaceutical compositions may be analyzed using *in vitro* or *in vivo* models.

Oral compositions may be prepared in the form of solutions, suspensions, tablets, pills, capsules, sustained release formulations, or powders. These compositions can be administered, for example, by swallowing or inhaling. Where a pharmaceutical composition is to be inhaled, the composition will preferably comprise an aerosol. Exemplary procedures for the preparation of aqueous aerosols may be found in U.S. Patent No. 5,049,388, the disclosure of which is specifically incorporated herein by reference in its entirety. Preparation of dry aerosol

preparations are described in, for example, U.S. Patent No. 5,607,915, the disclosure of which is specifically incorporated herein by reference in its entirety.

Also useful is the administration of the compounds described herein directly in transdermal formulations with permeation enhancers such as DMSO. These compositions can similarly include any other suitable carriers, excipients or diluents. Other topical formulations can be administered to treat certain disease indications. For example, intranasal formulations may be prepared which include vehicles that neither cause irritation to the nasal mucosa nor significantly disturb ciliary function. Diluents such as water, aqueous saline or other known substances can be employed with the subject invention. The nasal formulations also may contain preservatives such as, but not limited to, chlorobutanol and benzalkonium chloride. A surfactant may be present to enhance absorption of the subject compounds by the nasal mucosa.

Upon formulation, solutions may be administered in a manner compatible with the dosage formulation and in such amount as is therapeutically effective. The formulation of choice can be accomplished using a variety of excipients including, for example, pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, sodium saccharin cellulose, magnesium carbonate, and the like. Typically, pharmaceutical compositions will contain from less than 1% to about 95% of the active ingredient, preferably about 10% to about 50%. Preferably, between about 10 mg/kg patient body weight per day and about 25 mg/kg patient body weight per day will be administered to a patient, including a human patient. The frequency of administration will be determined by the care given based on patient responsiveness. Other effective dosages can be readily determined by one of ordinary skill in the art through routine trials establishing dose response curves.

Regardless of the mode of administration, suitable pharmaceutical compositions in accordance with the invention will generally include an amount of active ingredient admixed with an acceptable pharmaceutical diluent or excipient, such as a sterile aqueous solution, to give a range of final concentrations, depending on the intended use. The techniques of preparation are generally well known in the art as exemplified by Remington's Pharmaceutical Sciences, 16th Ed. Mack Publishing Company, 1980, which reference is specifically incorporated herein by reference in its entirety. It should be appreciated that endotoxin contamination should be kept minimally at a safe level, for example, less than 0.5 ng/mg protein. Moreover, for human

administration, preparations should meet sterility, pyrogenicity, general safety and purity standards as required by FDA Office of Biological Standards.

The therapeutically effective doses are readily determinable using an animal model. For example, experimental animals exhibiting a target infection or other ailment are frequently used to optimize appropriate therapeutic doses prior to translating to a clinical environment. Such models are known to be very reliable in predicting effective therapies. In certain embodiments, it may be desirable to provide a continuous supply of therapeutic compositions to the patient. For intravenous or intraarterial routes, this is accomplished by drip system. For topical applications, repeated application would be employed. For various approaches, delayed release formulations could be used that provided limited but constant amounts of the therapeutic agent over an extended period of time. For internal application, continuous perfusion of the region of interest may be preferred. This could be accomplished by catheterization, post-operatively in some cases, followed by continuous administration of the therapeutic agent. The time period for perfusion would be selected by the clinician for the particular patient and situation, but times could range from about 1-2 hours, to 2-6 hours, to about 6-10 hours, to about 10-24 hours, to about 1-2 days, to about 1-2 weeks or longer. Generally, the dose of the therapeutic composition via continuous perfusion will be equivalent to that given by single or multiple injections, adjusted for the period of time over which the injections are administered. It is believed that higher doses may be achieved via perfusion, however.

Therapeutic kits comprising the compositions described herein are also provided by the invention. Such kits will generally contain, in suitable container means, a pharmaceutically or agriculturally acceptable formulation of the active ingredient. The kits also may contain other pharmaceutically acceptable formulations, such as an antiinfective agent, including an insecticide, antifungal or antibacterial, as well as a herbicide.

The kits may have a single container means that contains the active ingredient, with or without any additional components, or they may have distinct container means for each desired agent. When the components of the kit are provided in one or more liquid solutions, the liquid solution is an aqueous solution, with a sterile aqueous solution being particularly preferred. However, the components of the kit may be provided as dried powder(s). When reagents or components are provided as a dry powder, the powder can be reconstituted by the addition of a suitable solvent. It is envisioned that the solvent also may be provided in another container

means. The container means of the kit will generally include at least one vial, test tube, flask, bottle, syringe or other container means, into which the active compound, and any other desired agent, may be placed and, preferably, suitably aliquoted. Where additional components are included, the kit will also generally contain a second vial or other container into which these are placed, enabling the administration of separated designed doses. The kits also may comprise a second/third container means for containing a sterile, pharmaceutically acceptable buffer or other diluent.

The kits also may contain a means by which to administer the compositions to an animal or patient, *e.g.*, one or more needles or syringes, or even an eye dropper, pipette, or other such like apparatus, from which the formulation may be injected into the animal or applied to a afflicted area of the body. The kits of the present invention will also typically include a means for containing the vials, or such like, and other component, in close confinement for commercial sale, such as, *e.g.*, injection or blow-molded plastic containers into which the desired vials and other apparatus are placed and retained.

The invention also provides compositions formulated for agricultural use. Examples of such formulations include herbicidal, fungicidal and plant growth regulator compositions. Specific formulations for plant application are known to those of skill in the art and are described, for example, in U.S. Patent No. 6,242,382, the disclosure of which is specifically incorporated herein by reference in its entirety.

Examples of ingredients that may be included in a composition of the invention formulated for application to plants include surfactants, solid or liquid carriers, solvents and binders. Examples of suitable surfactants that may be used for application to plants include the alkali metal, alkaline earth metal or ammonium salts of aromatic sulfonic acids, *e.g.*, ligno-, phenol-, naphthalene- and dibutylnaphthalenesulfonic acid, and of fatty acids of arylsulfonates, of alkyl ethers, of lauryl ethers, of fatty alcohol sulfates and of fatty alcohol glycol ether sulfates, condensates of sulfonated naphthalene and its derivatives with formaldehyde, condensates of naphthalene or of the naphthalenesulfonic acids with phenol and formaldehyde, condensates of phenol or phenolsulfonic acid with formaldehyde, condensates of phenol with formaldehyde and sodium sulfite, polyoxyethylene octylphenyl ether, ethoxylated isooctyl-, octyl- or nonylphenol, tributylphenyl polyglycol ether, alkylaryl polyether alcohols, isotridecyl alcohol, ethoxylated castor oil, ethoxylated triarylphenols, salts of phosphated triarylphenoethoxylates, lauryl alcohol

polyglycol ether acetate, sorbitol esters, lignin-sulfite waste liquors or methylcellulose, or mixtures of these. Common practice in the case of surfactant use is to include about 0.5 to 25% by weight, based on the total weight of the solid mixture.

5 Compositions for application to plants may be solid or liquid. Where solid compositions are used, it may be desired to include one or more carrier materials with the active compound. Examples of carriers include mineral earths such as silicas, silica gels, silicates, talc, kaolin, attaclay, limestone, chalk, loess, clay, dolomite, diatomaceous earth, calcium sulfate, magnesium sulfate, magnesium oxide, ground synthetic materials, fertilizers such as ammonium sulfate, ammonium phosphate, ammonium nitrate, thiourea and urea, products of vegetable origin such  
10 as cereal meals, tree bark meal, wood meal and nutshell meal, cellulose powders, attapulgites, montmorillonites, mica, vermiculites, synthetic silicas and synthetic calcium silicates, or mixtures of these.

For liquid solutions, water-soluble compounds or salts may be included, such as sodium sulfate, potassium sulfate, sodium chloride, potassium chloride, sodium acetate, ammonium  
15 hydrogen sulfate, ammonium chloride, ammonium acetate, ammonium formate, ammonium oxalate, ammonium carbonate, ammonium hydrogen carbonate, ammonium thiosulfate, ammonium hydrogen diphosphate, ammonium dihydrogen monophosphate, ammonium sodium hydrogen phosphate, ammonium thiocyanate, ammonium sulfamate or ammonium carbamate.

Other exemplary components in compositions of the invention include binders such as  
20 polyvinylpyrrolidone, polyvinyl alcohol, partially hydrolyzed polyvinyl acetate, carboxymethylcellulose, starch, vinylpyrrolidone/vinyl acetate copolymers and polyvinyl acetate, or mixtures of these; lubricants such as magnesium stearate, sodium stearate, talc or polyethylene glycol, or mixtures of these; antifoams such as silicone emulsions, long-chain alcohols, phosphoric esters, acetylene diols, fatty acids or organofluorine compounds, and  
25 complexing agents such as: salts of ethylenediaminetetraacetic acid (EDTA), salts of trinitrilotriacetic acid or salts of polyphosphoric acids, or mixtures of these.

In certain embodiments of the invention, compositions are provided with herbicidal activity which comprise one or more ectophosphatase inhibitor(s) and a herbicide selected from the group consisting of pendimethalin, dicamba, 2,4-D, glufosinate, bentazon, trifluralin, oryzalin, S-metolachlor, nicosulfuron, MSMA, Epic™ and Balance™. In one embodiment of  
30 the invention, the ectophosphatase inhibitor is selected from the group of the compounds of



formulae I-XX. In certain other embodiments of the invention, compositions with fungicidal activity are provided which comprise one or more ectophosphatase inhibitor(s) in combination with metalaxyl, tebuconazole, propiconazole, chlorothalonil and/or fluconazole.

Non-limiting examples of combinations of cytotoxic agents and ectophosphatase inhibitors for use in accordance with the invention include: fluconazole with compound(s) of formula II, IX, XIV, XVI, XV, X and/or XII; formula I and/or II with pendimethalin, dicamba, 2,4-D, bentazon, trifluralin, flufenacet/isoxaflutole or isoxaflutole; glufosinate with formula II; oryzalin with formula I; nicosulfuron with formula II; MSMA with formula XVIII; S-metolachlor with formula VI and/or X; metribuzin with formula I, II and/or X; diuron with formula VI; metalaxyl with formula X; chlorothalonil with formula II, X, IX, XI, XVI; propiconazole with formula I, X, XIV and/or XVI; mancozeb with formula I, VI and/or X; captan with formula XIV and/or XVI; tebuconazole with formula I and/or X; imidacloprid with formula II, X, XVIII, XVI and/or XV; and fertilizers such as Nitrogen, Phosphate, Potash -- 12:12:12 with formula I and/or II.

Also envisioned for use with the invention are compositions comprising combinations of ectophosphatase inhibitors and cytotoxic agents or other active ingredients, including a herbicide, insecticide, antibiotic, fungicide, plant growth regulator and/or hormone. Such combinations may provide enhanced activity of the active ingredient relative to the use of a single ectophosphatase inhibitor. Non-limiting examples of such combinations of ectophosphatase inhibitors include combinations of two, three, four or more ectophosphatase inhibitors selected from formulas I, II, VI, X, XV, XIV, XVI, XVI, XV, and XVIII. Included for illustrative purposes are the following combinations: I and II; I, II and X; XIV and XVI; XVIII and XVI; XVIII, XVI and XV; VI and X; II and X; and II and XVIII.

Specifically contemplated by the inventors are compositions comprising an ectophosphatase inhibitor and an active ingredient set forth in Table 1.

**Table 1: Cytotoxic agents and other active ingredients**

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Bis(2-ethylhexyl) phthalate	117-81-7	3E+05	NA 11	N/A	Alkyl Phthalate
Butyl benzyl phthalate	85-68-7	NA 141	3080	N/A	Alkyl Phthalate
Chlorthal-dimethyl	1861-32-1	78701	179	Herbicide	Alkyl Phthalate
Di-n-octyl phthalate	117-84-0	NA 303	223	N/A	Alkyl Phthalate
Dibutyl phthalate	84-74-2	28001	199	Insect Repellent	Alkyl Phthalate
Diethyl phthalate	84-66-2	1E+05	3326	N/A	Alkyl Phthalate
Diisodecyl phthalate	NA 1037	NA 132	2513	N/A	Alkyl Phthalate
Dimethyl phthalate	131-11-3	28002	232	Insect Repellent	Alkyl Phthalate
Diocetyl terephthalate	NA 724	NA 133	2528	N/A	Alkyl Phthalate
Diphenyl phthalate	84-62-8	17001	NA 147	N/A	Alkyl Phthalate
Isooctyl phthalate	27554-26-3	NA 483	2262	N/A	Alkyl Phthalate
n-Butyl phthalate	84-74-2	28001	3081	Insecticide	Alkyl Phthalate
Poly glyceryl phthalate ester of coconut oil fatty acid	NA 327	NA 608	3331	Adjuvant, Soap/Surfactant	Alkyl Phthalate
1,3-Dimethyl-1,1,3,3-disiloxanetetrol-1,3-bis(dimethylthiocarbamate)	22232-20-8	34601	NA 303	N/A	Bis-Carbamate
2,3(and 3,4)-Dichlorobenzyl methylcarbamates	62046-37-1	3E+05	NA 136	Insecticide	N-Methyl Carbamate
2,4-Dimethyl-1,3-dithiolane-2-carboxaldehyde O-(methylcarbamoyl)oxime	26419-73-8	4E+05	NA 143	Insecticide	N-Methyl Carbamate
2-(4,5-Dimethyl-1,3-dioxolan-2-yl)phenyl-N-methylcarbamate	#####	4E+05	NA 145	Insecticide	N-Methyl Carbamate
2-chloro-4,5-xylyl N-hydroxy-N-methylcarbamate	14357-82-5	2E+05	NA 117	Insecticide	N-Methyl Carbamate
2-cyclopentylphenyl methylcarbamate	3282-00-6	3E+05	NA 132	Insecticide	N-Methyl Carbamate
2-Hydroxyphenyl methylcarbamate	10309-97-4	2E+05	NA 118	Insecticide	N-Methyl Carbamate
3,4-Dichlorobenzyl methylcarbamate	2328-31-6	3E+05	NA 136	Insecticide	N-Methyl Carbamate
3,5-Diisopropylphenyl methylcarbamate	330-64-3	4E+05	NA 142	Insecticide	N-Methyl Carbamate
3-hydroxycarbofuran	16655-82-6	2E+05	4074	Breakdown product	N-Methyl Carbamate
3-iodo-2-propynyl butyl carbamate	55406-53-6	1E+05	1938	Fungicide, Wood Preservative	Other Carbamate
3-ketocarbofuran	16709-30-1	NA 176	NA 164	Breakdown product	N-Methyl Carbamate
4-(((Dimethylamino)methylene)amino)-m-tolyl methylcarbamate	17702-57-7	4E+05	NA 142	Insecticide	N-Methyl Carbamate
4-(Methylamino)-3,5-xylyl methylcarbamate	10389-50-1	2E+05	NA 118	Insecticide	N-Methyl Carbamate
4-(Methylformamido)-3,5-xylyl methylcarbamate	10233-94-0	2E+05	NA 118	Insecticide	N-Methyl Carbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
4-(Methylthio)-m-tolyl methylcarbamate	3566-00-5	6E+05	NA 157	Insecticide	N-Methyl Carbamate
4-Amino-3,5-xylyl methylcarbamate	831-76-5	2E+05	NA 117	Insecticide	N-Methyl Carbamate
5,6,7,8-Tetrahydro-1-naphthyl methylcarbamate	1136-84-1	4E+05	NA 148	Insecticide	N-Methyl Carbamate
6-(and 2)-chloro-3,4-xylyl methylcarbamate	8063-85-2	38701	NA 322	Insecticide	N-Methyl Carbamate
6-Methyl-2-propyl-4-pyrimidinyl dimethylcarbamate	2532-49-2	6E+05	NA 157	N/A	Other Carbamate
Alanycarb	83130-01-2	NA 175	NA 47	Insecticide	Other Carbamate
Aldicarb	116-06-3	98301	575	Insecticide, Nematicide	N-Methyl Carbamate
Aldicarb sulfoxide	1646-87-3	1E+05	2361	Breakdown product	N-Methyl Carbamate
Aldoxycarb	1646-88-4	1E+05	2265	Breakdown product	N-Methyl Carbamate
Allyxycarb	6392-46-7	3E+05	NA 133	Insecticide	N-Methyl Carbamate
Aminocarb	2032-59-9	44401	2435	Insecticide	N-Methyl Carbamate
Asulam	3337-71-1	1E+05	5076	Herbicide	Other Carbamate
Asulam, sodium salt	2302-17-2	1E+05	1746	Herbicide	Other Carbamate
Bendiocarb	22781-23-3	1E+05	1924	Insecticide	N-Methyl Carbamate
Benfuracarb	82560-54-1	1E+05	NA 48	Insecticide	Other Carbamate
Bufencarb	2282-34-0	59302	91	Insecticide	N-Methyl Carbamate
Bufencarb	8065-36-9	59303	NA 485	Insecticide	N-Methyl Carbamate
Bufencarb, component of (with 059302)	672-04-8	59301	NA 484	Insecticide	N-Methyl Carbamate
Butacarb	2655-19-8	3E+05	NA 135	Insecticide	N-Methyl Carbamate
Butocarboxim	34681-10-2	NA 175	NA 49	Insecticide	N-Methyl Carbamate
Butoxycarboxim	34681-23-7	1E+05	2201	Insecticide	N-Methyl Carbamate
Butylate	2008-41-5	41405	565	Herbicide	Thiocarbamate
Calcium ethylenebis(dithiocarbamate)	5895-18-1	14501	NA 139	Microbiocide	Dithiocarbamate
Carbanolate	671-04-5	2E+05	NA 124	Insecticide	N-Methyl Carbamate
Carbaryl	63-25-2	56801	105	Insecticide, Plant Growth Regulator, Nematicide	N-Methyl Carbamate
Carbofuran	1563-66-2	90601	106	Insecticide, Nematicide	N-Methyl Carbamate
Carbosulfan	55285-14-8	90602	2182	Insecticide	N-Methyl Carbamate
Chlorbufam	1967-16-4	6E+05	NA 157	Herbicide	Other Carbamate
Chlorprocarb	23121-99-5	3E+05	NA 136	Herbicide	Other Carbamate
Chlorpropham	101-21-3	18301	141	Herbicide, Plant Growth Regulator	Other Carbamate
Cloethocarb	51487-69-5	1E+05	NA 100	Insecticide, Molluscicide	N-Methyl Carbamate
Cufraneb	11096-18-7	NA 181	NA 180	Fungicide	Dithiocarbamate
Cycloate	1134-23-2	41301	516	Herbicide	Thiocarbamate
Desmedipham	13684-56-5	1E+05	1748	Herbicide	Bis-Carbamate
Diammonium ethylenebis(dithiocarbamate)	#####	14502	NA 140	Microbiocide	Dithiocarbamate
Dichlormate	1966-58-1	3E+05	690	Herbicide	N-Methyl Carbamate
Diethofencarb	87130-20-9	NA 184	NA 183	Fungicide	Other Carbamate
Dimepiperate	61432-55-1	NA 186	NA 185	Herbicide	Thiocarbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Dimetan	122-15-6	1E+05	NA 112	Insecticide	Other Carbamate
Dimethyl (4-methyl-1,3-phenylenebis(iminocarbonyl-1H-benzimidazole-1,2-diyl))biscarbamate	51543-98-7	1E+05	NA 888	Fungicide	Bis-Carbamate
Dimetilan	644-64-4	90101	NA 844	Insecticide	Other Carbamate
Dioxacarb	6988-21-2	4E+05	4067	Insecticide	N-Methyl Carbamate
EPTC	759-94-4	41401	264	Herbicide	Thiocarbamate
Esprocarb	85785-20-2	NA 203	NA 202	Herbicide	Thiocarbamate
Ethiofencarb	29973-13-5	1E+05	NA 50	Insecticide	N-Methyl Carbamate
Ethiolate	2941-55-1	1E+05	1793	Herbicide	Thiocarbamate
Fenethacarb	30087-47-9	3E+05	NA 141	Insecticide	N-Methyl Carbamate
Fenobucarb	3766-81-2	NA 176	NA 51	Insecticide	N-Methyl Carbamate
Fenothiocarb	62850-32-2	NA 188	NA 187	Insecticide	Thiocarbamate
Fenoxycarb	79127-80-3	1E+05	2283	Insecticide, Insect Growth Regulator	Other Carbamate
Fenoxycarb	72490-01-8	NA 228	NA 228	Insecticide, Insect Growth Regulator	Other Carbamate
Ferbam	14484-64-1	34801	288	Fungicide	Dithiocarbamate
Ferric nitroso dimethyl dithiocarbamate	83542-83-0	5E+05	NA 149	Microbiocide	Dithiocarbamate
Formetanate	22259-30-9	5E+05	NA 150	Insecticide	N-Methyl Carbamate
Formetanate hydrochloride	23422-53-9	97301	111	Insecticide	N-Methyl Carbamate
Furathiocarb	65907-30-4	NA 176	NA 52	Insecticide	Thiocarbamate
Isolan	119-38-0	5E+05	NA 155	Insecticide	Other Carbamate
Isopolinate	3134-70-1	NA 232	NA 232	Herbicide	Thiocarbamate
Isoproc carb	2631-40-5	5E+05	NA 53	Insecticide	N-Methyl Carbamate
Karbutilate	4849-32-5	97401	691	Herbicide	Other Carbamate
m-Cumenyl methylcarbamate	64-00-6	47801	NA 414	Insecticide	N-Methyl Carbamate
Mancopper	53988-93-5	NA 181	NA 180	Fungicide	Dithiocarbamate
Mancozeb	#####	14504	211	Fungicide	Dithiocarbamate, Inorganic-Zinc
Maneb	12427-38-2	14505	369	Fungicide	Dithiocarbamate
Maneb and nickel sulfate hexahydrate (014505 + 050505)	8005-46-7	6E+05	NA 158	Fungicide	Dithiocarbamate, Inorganic-Nickel
Manganous dimethyldithiocarbamate	15339-36-3	34802	NA 304	Fungicide	Dithiocarbamate
Mecarbinizid	27386-64-7	6E+05	NA 157	N/A	Other Carbamate
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Metam sodium, dihydrate	137-42-8	39003	NA 163	Fumigant, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Metam-sodium	6734-80-1	39003	616	Fumigant, Herbicide, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Methasulfocarb	66952-49-6	NA 202	NA 201	Fungicide,	Thiocarbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Plant Growth Regulator	
Methiobencarb	18357-78-3	NA 232	NA 232	Herbicide	Thiocarbamate
Methiocarb	2032-65-7	1E+05	375	Insecticide, Molluscicide	N-Methyl Carbamate
Methiocarb sulfone	2179-25-1	2E+05	4077	Breakdown product	N-Methyl Carbamate
Methiocarb sulfoxide	#####	2E+05	4078	Breakdown product	N-Methyl Carbamate
Methomyl	16752-77-5	90301	383	Insecticide, Breakdown product	N-Methyl Carbamate
Metiram	9006-42-2	14601	493	Fungicide	Dithiocarbamate, Inorganic-Zinc
Metolcarb	1129-41-5	NA 202	NA 201	Insecticide	N-Methyl Carbamate
Mexacarbate	315-18-4	44201	623	Insecticide	N-Methyl Carbamate
Mobam	1079-33-0	90401	NA 848	Insecticide	N-Methyl Carbamate
Molinate	2212-67-1	41402	449	Herbicide	Thiocarbamate
Molinate sulfoxide	NA 1052	NA 156	4080	Breakdown product	Thiocarbamate
Morpholinomethyl dimethyldithiocarbamate	31848-11-0	6E+05	NA 158	Microbiocide	Dithiocarbamate
Nabam	142-59-6	14503	417	Fungicide, Herbicide	Dithiocarbamate
Nitrilacarb	29672-19-3	2E+05	NA 129	Insecticide	Other Carbamate
o-(2-Propynyloxy)phenyl methylcarbamate	3279-46-7	3E+05	NA 138	Insecticide	N-Methyl Carbamate
Orbencarb	34622-58-7	NA 189	NA 188	Herbicide	Thiocarbamate
Oxamyl	23135-22-0	1E+05	1910	Insecticide, Nematicide	N-Methyl Carbamate
Pebulate	1114-71-2	41403	590	Herbicide	Thiocarbamate
Phenisopham	57375-63-0	NA 209	NA 208	Herbicide	Bis-Carbamate
Phenmedipham	13684-63-4	98701	675	Herbicide	Bis-Carbamate
Phenmedipham-ethyl	13684-44-1	4E+05	NA 149	Herbicide	Bis-Carbamate
Phenylmercuric dimethyldithiocarbamate	32407-99-1	66008	NA 555	Microbiocide, Fungicide	Organomercury, Dithiocarbamate, Heavy metal
Pirimicarb	23103-98-2	1E+05	1875	Insecticide	N-Methyl Carbamate
Pirimicarb sulfone	NA 1050	NA 155	4090	Breakdown product	N-Methyl Carbamate
Pirimicarb sulfoxide	NA 1049	NA 155	4091	Breakdown product	N-Methyl Carbamate
Potassium ammonium ethylenebis(dithiocarbamate)	22221-14-3	14507	NA 141	Microbiocide	Dithiocarbamate
Potassium asulam	14089-43-1	1E+05	NA 893	Herbicide	Other Carbamate
Potassium dimethyl dithio carbamate	128-03-0	34803	1934	Microbiocide	Dithiocarbamate
Potassium N-hydroxymethyl-N-methyldithio carbamate	51026-28-9	1E+05	1824	N/A	Dithiocarbamate
Potassium N-methyldithio carbamate	137-41-7	39002	970	Fumigant, Fungicide, Microbiocide, Algacide, Nematicide	Dithiocarbamate
Promacyl	34264-24-9	NA 209	NA 209	Insecticide	N-Methyl Carbamate
Promecarb	2631-37-0	3E+05	4092	Insecticide	N-Methyl Carbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Propamocarb	24579-73-5	1E+05	2147	Fungicide	Other Carbamate
Propamocarb hydrochloride	25606-41-1	1E+05	4022	Fungicide	Other Carbamate
Propham	122-42-9	47601	339	Herbicide, Plant Growth Regulator	Other Carbamate
Propineb	12071-83-9	5E+05	NA 155	Fungicide, Microbiocide	Dithiocarbamate, Inorganic-Zinc
Propoxur	114-26-1	47802	62	Insecticide	N-Methyl Carbamate
Propoxur, other related	NA 1073	NA 161	90062	Insecticide	N-Methyl Carbamate
Prosulfocarb	52888-80-9	NA 185	NA 184	Herbicide	Thiocarbamate
Prothiocarb	19622-08-3	NA 183	NA 182	Fungicide	Thiocarbamate
Prothiocarb hydrochloride	19622-19-6	NA 200	NA 199	Fungicide	Thiocarbamate
Pyributicarb	88678-67-5	NA 229	NA 229	Herbicide	Thiocarbamate
Pyrolan	87-47-8	6E+05	NA 157	Insecticide	Other Carbamate
S-tert-Butyl dipropylthiocarbamate	2212-63-7	2E+05	NA 128	Herbicide	Thiocarbamate
Sodium dimethyl dithio carbamate	128-04-1	34804	548	Fungicide	Dithiocarbamate
Sulfallate	95-06-7	39001	115	Herbicide	Dithiocarbamate
Sweep	1918-18-9	84601	4098	N/A	Other Carbamate
Terbutol	#####	38801	51	Herbicide	N-Methyl Carbamate
Tert-butyl dimethyl trithio peroxycarbamate	3304-97-0	34807	1383	Rodent Repellent	Dithiocarbamate
Tert- butyldimethyltrithioperoxycarb amate, other related	NA 1130	NA 166	91383	N/A	Dithiocarbamate
Thiobencarb	28249-77-6	1E+05	1933	Herbicide	Thiocarbamate
Thiobencarb sulfoxide	NA 1042	NA 139	2937	Breakdown product	Thiocarbamate
Thiocarboxime	25171-63-5	6E+05	NA 156	N/A	N-Methyl Carbamate
Thiodicarb	59669-26-0	1E+05	2202	Molluscicide, Insecticide	Thiocarbamate
Thiofanox	39196-18-4	1E+05	2938	Insecticide	N-Methyl Carbamate
Thiram	137-26-8	79801	589	Fungicide	Dithiocarbamate
Thiram and NAD and IBA and 2-methyl-1- naphthaleneacetamide and 2- methyl-1-naphthaleneacetic acid	75497-92-6	56011	NA 463	Fungicide, Plant Growth Regulator	Dithiocarbamate
Tiocabazil	36756-79-3	1E+05	NA 911	Herbicide	Thiocarbamate
Triallate	2303-17-5	78802	49	Herbicide	Thiocarbamate
Tricopper dichloride dimethyldithiocarbamate	7076-63-3	5E+05	NA 152	Microbiocide	Dithiocarbamate, Inorganic-Copper
Trimethacarb	12407-86-2	1E+05	2962	Insecticide, Molluscicide, Dog and Cat Repellent	N-Methyl Carbamate
Trimethacarb, (2,3,5)- component of	2655-15-4	1E+05	NA 882	Insecticide, Molluscicide	N-Methyl Carbamate
Trimethacarb, (3,4,5)- component of	2686-99-9	1E+05	NA 881	Insecticide, Molluscicide	N-Methyl Carbamate
Vernolate	1929-77-7	41404	1987	Herbicide	Thiocarbamate
XMC	2655-14-3	NA 176	NA 54	Insecticide	N-Methyl Carbamate
Xylylcarb	#####	NA 176	NA 55	Insecticide	N-Methyl Carbamate
Zineb	12122-67-7	14506	627	Fungicide	Dithiocarbamate, Inorganic-Zinc

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Zineb-ethylene thiuram disulfide adduct	NA 1465	NA 217	NA 216	Fungicide	Dithiocarbamate, Inorganic-Zinc
Ziram	137-30-4	34805	629	Fungicide, Microbiocide, Dog and Cat Repellent	Dithiocarbamate, Inorganic-Zinc
Ziram, cyclohexylamine complex	16509-79-8	34806	1328	Dog and Cat Repellent, Fungicide	Dithiocarbamate, Inorganic-Zinc
Acetamiprid	135410-20-7	99050	NA 864	Insecticide	Chloro-nicotinyl
Imidacloprid	105827-78-9	#####	3849	Insecticide	Chloro-nicotinyl
Imidacloprid	138261-41-3	#####	NA 111	Insecticide	Chloro-nicotinyl
Thiacloprid	111988-49-9	NA 201	NA 201	Insecticide	Chloro-nicotinyl
Halofenozide	112226-61-6	#####	5019	Insecticide	Diacylhydrazine
Methoxyfenozide	161050-58-4	#####	NA 983	Insecticide	Diacylhydrazine
Tebufenozide	112410-23-8	#####	3957	Insecticide	Diacylhydrazine
Bacillus thuringiensis Cry1F protein and the genetic material necessary for its production (plasmid insert PHI8999) in corn pla	NA 1486	6481	NA 220	Insecticide	GE Crop
Bacillus thuringiensis Cry1Ab Delta-Endotoxin and the Genetic Material Necessary for Its Production in Corn [MON 810]	NA 1487	6430	NA 220	Insecticide	GE Crop
Bacillus thuringiensis delta endotoxin produced in corn	68038-71-1	NA 160	3954	Insecticide	GE Crop
Bacillus thuringiensis subsp. Kurstaki CryIA (c) delta-endotoxin and the genetic material necessary for its production in corn	NA 1226	6463	NA 170	Insecticide	GE Crop
Bacillus thuringiensis subsp. Kurstaki, delta-endotoxin as produced in corn by an HD-1 gene, and its controlling sequences and	68038-71-1	6444	5048	Insecticide	GE Crop
Bacillus thuringiensis subsp. Tolworthi Cry9C protein and the genetic material necessary for its production (pRVA9909) in corn p	NA 1233	6466	NA 171	Insecticide	GE Crop
Bacillus thuringiensis subspecies Tenebrionis delta endotoxin as produced in potato by Cry IIIA gene and its controlling sequenc	NA 1237	6432	NA 171	Insecticide	GE Crop
Bacillus thuringiensis var. Kurstaki protein in cottonseed	NA 1480	6402	3554	Insecticide	GE Crop
Bacillus thuringiensis, subsp. Kurstaki, strain HD-1, delta-endotoxin as produced in corn by a Cry 1A(b) gene and its controlling	68038-71-1	6461	3986	Insecticide	GE Crop
HD-1 Protein as encoded by Bacillus thuringiensis subsp.	NA 1273	6408	NA 173	Insecticide	GE Crop

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
kurstaki gene and produced in corn					
Plant pesticide Bacillus thuringiensis Cry1A(b) delta-endotoxin and the genetic material necessary for its production (plasmid V	NA 1285	6458	NA 174	Insecticide	GE Crop
Potato leafroll virus (PLRV) replicase protein as produced in potato plants	NA 1295	6469	NA 175	Fungicide	GE Crop
1,1,1-trichloroethane	71-55-6	81201	138	Solvent	Halogenated organic
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	NA 972	2960	Solvent	Halogenated organic
1,1,2-trichloroethane	79-00-5	81203	1425	Solvent	Halogenated organic
1,2,3,4-Tetrachlorobenzene	634-66-2	61101	NA 494	N/A	Halogenated organic
1,2,4-trichlorobenzene	120-82-1	81101	600	N/A	Halogenated organic
1,2-dichloropropane	78-87-5	29002	2501	Fumigant, Nematicide	Halogenated organic
1,2-Dichloropropane mixt. with 1,3-dichloropropene and methyl isothiocyanate	#####	29004	NA 215	Fumigant, Nematicide	Halogenated organic
1,2-dichloropropane, 1,3-dichloropropene and related C3 compounds	NA 1022	29002	185	Fumigant, Nematicide	Halogenated organic
1,3-Dichloro-1-propene, mixt. with 1,2-dichloropropane	8003-19-8	29003	NA 214	Fumigant, Nematicide	Halogenated organic
1,3-dichloropropene	542-75-6	29001	573	Fumigant, Nematicide	Halogenated organic
1-chloro-1,1-difluoro ethane	75-68-3	NA 423	3103	Solvent	Halogenated organic
1-chlorobutane	109-69-3	NA 425	1151	Solvent	Halogenated organic
3-chloro-2-methyl propene	563-47-3	NA 422	2463	N/A	Halogenated organic
Bis(2,2-dichloroethyl)ether	1191-17-9	29502	NA 217	N/A	Halogenated organic
Bromoethane	74-96-4	NA 131	2427	N/A	Halogenated organic
Carbon tetrachloride	56-23-5	16501	109	Solvent, Fumigant	Halogenated organic
Carbon tetrachloride with EDB & EDC	53908-27-3	16503	NA 146	Fumigant, Nematicide	Halogenated organic
Carbon tetrachloride with EDC	#####	16502	NA 145	Fumigant, Nematicide	Halogenated organic
Carbon tetrafluoride	75-73-0	NA 113	3099	Propellant	Halogenated organic
Chloro difluoro methane	75-45-6	15	3104	Propellant, Fumigant, Insecticide	Halogenated organic
Chlorodibromomethane	124-48-1	NA 426	2462	N/A	Halogenated organic
Chloroform	67-66-3	20701	133	Solvent, Fumigant	Halogenated organic
DBCP	96-12-8	11301	183	Fumigant, Nematicide	Halogenated organic
DBCP, other related	NA 1079	NA 161	90183	Fumigant, Nematicide	Halogenated organic
Dichloroethylene, 1,1-	75-35-4	6E+05	NA 13	Impurity	Halogenated organic
Dichlorofluoromethane	75-43-4	NA 348	1815	Propellant	Halogenated organic
Difluoro diphenyl trichloroethane	475-26-3	32001	NA 293	N/A	Halogenated organic
Ethane, 1,1,1,2-tetrafluoro-	811-97-2	1E+05	NA 873	N/A	Halogenated organic
Ethyl chloride	75-00-3	NA 114	3198	N/A	Halogenated organic



Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Ethylene chlorobromide	107-04-0	42001	2557	N/A	Halogenated organic
Ethylene dibromide	106-93-4	42002	271	Fumigant, Nematicide	Halogenated organic
Ethylene dichloride	107-06-2	42003	274	Fumigant, Insecticide	Halogenated organic
Freon 11	75-69-4	13	1460	Propellant, Fumigant, Insecticide	Halogenated organic
Freon 12	75-71-8	14	1459	Propellant, Fumigant, Insecticide	Halogenated organic
Halazone	80-13-7	77201	316	N/A	Halogenated organic
Hexachloroacetone	116-16-5	43701	320	Herbicide	Halogenated organic
Hexachloroacetone, other related	NA 1090	NA 162	90320	Herbicide	Halogenated organic
Hexachloroethane	67-72-1	45201	NA 22	N/A	Halogenated organic
Hydrofluorocarbon 152A	NA 617	NA 112	2599	Propellant	Halogenated organic
Methyl bromide	74-83-9	53201	385	Fumigant, Insecticide, Herbicide, Nematicide	Halogenated organic
Methyl chloride	74-87-3	53202	2677	N/A	Halogenated organic
Methyl iodide	74-88-4	NA 177	NA 165	Fumigant, Nematicide	Halogenated organic
Methylene chloride	75-09-2	42004	388	Solvent, Dog and Cat Repellent	Halogenated organic
Ortho-dichlorobenzene	95-50-1	59401	578	Insecticide	Halogenated organic
Ortho-dichlorobenzene, other related	NA 1116	NA 165	90683	Insecticide	Halogenated organic
Para-dichlorobenzene	106-46-7	61501	455	Insecticide, Insect Repellent, Rodenticide, Fungicide	Halogenated organic
Pentachloroethane	76-01-7	6E+05	NA 159	N/A	Halogenated organic
Propargyl bromide	106-96-7	68701	NA 608	Fumigant, Nematicide	Halogenated organic
Tetrachloroethane	79-34-5	78601	3559	Solvent, Fumigant	Halogenated organic
Tetrachloroethylene	127-18-4	78501	1174	Solvent	Halogenated organic
Tetraiodo ethylene	513-92-8	46908	582	N/A	Halogenated organic
trans-1,3-Dichloropropene	10061-02-6	NA 227	NA 227	Fumigant	Halogenated organic
Trichloro ethylene	79-01-6	81202	595	N/A	Halogenated organic
Trichlorobenzene	87-61-6	NA 971	1619	N/A	Halogenated organic
Trichlorofluoromethane	75-69-4	13	3482	Propellant, Fumigant, Insecticide	Halogenated organic
Trichloromethane	67-66-3	20701	1758	Solvent, Fumigant	Halogenated organic
2,3(and 3,4)-Dichlorobenzyl methylcarbamates	62046-37-1	#####	NA 136	Insecticide	N-Methyl Carbamate
2,4-Dimethyl-1,3-dithiolane-2-carboxaldehyde O-(methylcarbamoyl)oxime	26419-73-8	#####	NA 143	Insecticide	N-Methyl Carbamate
2-(4,5-Dimethyl-1,3-dioxolan-	1905930	#####	NA 145	Insecticide	N-Methyl Carbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
2-yl)phenyl-N-methylcarbamate					
2-chloro-4,5-xylyl N-hydroxy-N-methylcarbamate	14357-82-5	#####	NA 117	Insecticide	N-Methyl Carbamate
2-cyclopentylphenyl methylcarbamate	3282-00-6	#####	NA 132	Insecticide	N-Methyl Carbamate
2-Hydroxyphenyl methylcarbamate	10309-97-4	#####	NA 118	Insecticide	N-Methyl Carbamate
3,4-Dichlorobenzyl methylcarbamate	2328-31-6	#####	NA 136	Insecticide	N-Methyl Carbamate
3,5-Diisopropylphenyl methylcarbamate	330-64-3	#####	NA 142	Insecticide	N-Methyl Carbamate
3-hydroxycarbofuran	16655-82-6	#####	4074	Breakdown product	N-Methyl Carbamate
3-ketocarbofuran	16709-30-1	NA 176	NA 164	Breakdown product	N-Methyl Carbamate
4-(((Dimethylamino)methylene)amino)-m-tolyl methylcarbamate	17702-57-7	#####	NA 142	Insecticide	N-Methyl Carbamate
4-(Methylamino)-3,5-xylyl methylcarbamate	10389-50-1	#####	NA 118	Insecticide	N-Methyl Carbamate
4-(Methylformamido)-3,5-xylyl methylcarbamate	10233-94-0	#####	NA 118	Insecticide	N-Methyl Carbamate
4-(Methylthio)-m-tolyl methylcarbamate	3566-00-5	#####	NA 157	Insecticide	N-Methyl Carbamate
4-Amino-3,5-xylyl methylcarbamate	831-76-5	#####	NA 117	Insecticide	N-Methyl Carbamate
5,6,7,8-Tetrahydro-1-naphthyl methylcarbamate	1136-84-1	#####	NA 148	Insecticide	N-Methyl Carbamate
6-(and 2)-chloro-3,4-xylyl methylcarbamate	8063-85-2	38701	NA 322	Insecticide	N-Methyl Carbamate
Aldicarb	116-06-3	98301	575	Insecticide, Nematicide	N-Methyl Carbamate
Aldicarb sulfoxide	1646-87-3	#####	2361	Breakdown product	N-Methyl Carbamate
Aldoxycarb	1646-88-4	#####	2265	Breakdown product	N-Methyl Carbamate
Allyxycarb	6392-46-7	#####	NA 133	Insecticide	N-Methyl Carbamate
Aminocarb	2032-59-9	44401	2435	Insecticide	N-Methyl Carbamate
Bendiocarb	22781-23-3	#####	1924	Insecticide	N-Methyl Carbamate
Bufencarb	2282-34-0	59302	91	Insecticide	N-Methyl Carbamate
Bufencarb	8065-36-9	59303	NA 485	Insecticide	N-Methyl Carbamate
Bufencarb, component of (with 059302)	672-04-8	59301	NA 484	Insecticide	N-Methyl Carbamate
Butacarb	2655-19-8	#####	NA 135	Insecticide	N-Methyl Carbamate
Butocboxim	34681-10-2	NA 175	NA 49	Insecticide	N-Methyl Carbamate
Butoxycboxim	34681-23-7	#####	2201	Insecticide	N-Methyl Carbamate
Carbanolate	671-04-5	#####	NA 124	Insecticide	N-Methyl Carbamate
Carbaryl	63-25-2	56801	105	Insecticide, Plant Growth Regulator, Nematicide	N-Methyl Carbamate
Carbofuran	1563-66-2	90601	106	Insecticide, Nematicide	N-Methyl Carbamate
Carbosulfan	55285-14-8	90602	2182	Insecticide	N-Methyl Carbamate

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Cloethocarb	51487-69-5	#####	NA 100	Insecticide, Molluscicide	N-Methyl Carbamate
Dichlormate	1966-58-1	#####	690	Herbicide	N-Methyl Carbamate
Dioxacarb	6988-21-2	#####	4067	Insecticide	N-Methyl Carbamate
Ethiofencarb	29973-13-5	#####	NA 50	Insecticide	N-Methyl Carbamate
Fenethacarb	30087-47-9	#####	NA 141	Insecticide	N-Methyl Carbamate
Fenobucarb	3766-81-2	NA 176	NA 51	Insecticide	N-Methyl Carbamate
Formetanate	22259-30-9	#####	NA 150	Insecticide	N-Methyl Carbamate
Formetanate hydrochloride	23422-53-9	97301	111	Insecticide	N-Methyl Carbamate
Isoproc carb	2631-40-5	#####	NA 53	Insecticide	N-Methyl Carbamate
m-Cumenyl methylcarbamate	64-00-6	47801	NA 414	Insecticide	N-Methyl Carbamate
Methiocarb	2032-65-7	#####	375	Insecticide, Molluscicide	N-Methyl Carbamate
Methiocarb sulfone	2179-25-1	#####	4077	Breakdown product	N-Methyl Carbamate
Methiocarb sulfoxide	267266	#####	4078	Breakdown product	N-Methyl Carbamate
Methomyl	16752-77-5	90301	383	Insecticide, Breakdown product	N-Methyl Carbamate
Metolcarb	1129-41-5	NA 202	NA 201	Insecticide	N-Methyl Carbamate
Mexacarbate	315-18-4	44201	623	Insecticide	N-Methyl Carbamate
Mobam	1079-33-0	90401	NA 848	Insecticide	N-Methyl Carbamate
o-(2-Propynyloxy)phenyl methylcarbamate	3279-46-7	#####	NA 138	Insecticide	N-Methyl Carbamate
Oxamyl	23135-22-0	#####	1910	Insecticide, Nematicide	N-Methyl Carbamate
Pirimicarb	23103-98-2	#####	1875	Insecticide	N-Methyl Carbamate
Pirimicarb sulfone	NA 1050	NA 155	4090	Breakdown product	N-Methyl Carbamate
Pirimicarb sulfoxide	NA 1049	NA 155	4091	Breakdown product	N-Methyl Carbamate
Promacyl	34264-24-9	NA 209	NA 209	Insecticide	N-Methyl Carbamate
Promecarb	2631-37-0	#####	4092	Insecticide	N-Methyl Carbamate
Propoxur	114-26-1	47802	62	Insecticide	N-Methyl Carbamate
Propoxur, other related	NA 1073	NA 161	90062	Insecticide	N-Methyl Carbamate
Terbutol	5419	38801	51	Herbicide	N-Methyl Carbamate
Thiocarboxime	25171-63-5	#####	NA 156	N/A	N-Methyl Carbamate
Thiofanox	39196-18-4	#####	2938	Insecticide	N-Methyl Carbamate
Trimethacarb	12407-86-2	#####	2962	Insecticide, Molluscicide, Dog and Cat Repellent	N-Methyl Carbamate
Trimethacarb, (2,3,5)-component of	2655-15-4	#####	NA 882	Insecticide, Molluscicide	N-Methyl Carbamate
Trimethacarb, (3,4,5)-component of	2686-99-9	#####	NA 881	Insecticide, Molluscicide	N-Methyl Carbamate
XMC	2655-14-3	NA 176	NA 54	Insecticide	N-Methyl Carbamate
Xylylcarb	190572	NA 176	NA 55	Insecticide	N-Methyl Carbamate
Aldrin	309-00-2	45101	9	Insecticide	Organochlorine
Aldrin, other related	NA 1069	NA 160	90009	Insecticide	Organochlorine
alpha-BHC	319-84-6	NA 200	767	Insecticide	Organochlorine
Arochlor (composition unspecified, PCBs and/or PCTs)	12767-79-2	17803	NA 161	N/A	Organochlorine
Aroclor	1336-36-3	17801	5003	N/A	Organochlorine

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Bandane	8029-29-6	20301	54	Insecticide	Organochlorine
BHC (other than gamma isomer)	NA 1092	NA 162	90359	Insecticide	Organochlorine
BHC, beta isomer	319-85-7	NA 175	NA 46	Insecticide	Organochlorine
Chlordane	57-74-9	58201	130	Insecticide	Organochlorine
Chlordane, other related	NA 1075	NA 161	90130	Insecticide	Organochlorine
Chlordane, technical	12789-03-6	58202	NA 477	Insecticide	Organochlorine
Chlordecone	143-50-0	27701	347	Insecticide	Organochlorine
Chlorendic Acid	115-28-6	NA 228	NA 228	N/A	Organochlorine
DDD	72-54-8	29101	3002	Insecticide	Organochlorine
DDD	6088-31-3	NA 415	184	Breakdown product	Organochlorine
DDD, other related	NA 1080	NA 161	90184	Breakdown product	Organochlorine
DDE	72-55-9	NA 129	2092	Breakdown product	Organochlorine
DDT	50-29-3	29201	186	Insecticide	Organochlorine
Dicofol	115-32-2	10501	346	Insecticide	Organochlorine
Dieldrin	60-57-1	45001	210	Insecticide, Breakdown product	Organochlorine
Dieldrin, other related	NA 1085	NA 162	90210	Insecticide	Organochlorine
Dienochlor	2227-17-0	27501	468	Insecticide	Organochlorine
Dioxin (2,3,7,8-TCDD)	1746-01-6	#####	4068	Impurity	Organochlorine
Dioxin (other than 2,3,7,8-TCDD)	NA 1319	NA 177	NA 176	Impurity	Organochlorine
Endosulfan	115-29-7	79401	259	Insecticide	Organochlorine
Endosulfan I (alpha)	959-98-8	79402	NA 771	Insecticide	Organochlorine
Endosulfan II (beta)	33213-65-9	79403	4046	Insecticide	Organochlorine
Endosulfan sulfate	1031-07-8	79404	4047	Breakdown product	Organochlorine
Endrin	72-20-8	41601	262	Insecticide, Avicide	Organochlorine
Endrin aldehyde	7421-93-4	NA 156	4069	Breakdown product	Organochlorine
Endrin ketone	53494-70-5	41601	5029	Breakdown product	Organochlorine
Endrin, other related	NA 1086	NA 162	90262	Insecticide	Organochlorine
Heptachlor	76-44-8	44801	317	Insecticide	Organochlorine
Heptachlor epoxide	1024-57-3	44801	4073	Breakdown product	Organochlorine
Heptachlor, other related	NA 1089	NA 162	90317	Insecticide	Organochlorine
Hexachloro dibenzo-p-dioxin	34465-46-8	#####	2587	Impurity	Organochlorine
Hexachlorobenzene	118-74-1	61001	321	Microbiocide, Fungicide, Insecticide	Organochlorine
Hexachlorocyclohexane	608-73-1	8901	NA 20	Insecticide	Organochlorine
Hexachlorocyclopentadiene	77-47-4	27502	NA 21	Insecticide	Organochlorine
Hexachlorodibenzofuran (as impurity)	55684-94-1	#####	NA 161	Impurity	Organochlorine
Isodrin	465-73-6	NA 208	NA 207	Insecticide	Organochlorine
Kelevan	4234-79-1	NA 208	NA 208	Insecticide	Organochlorine
Lindane	58-89-9	9001	359	Insecticide, Rodenticide	Organochlorine
Methoxychlor	72-43-5	34001	384	Insecticide	Organochlorine
Methoxychlor, other related	NA 1093	NA 162	90384	Insecticide	Organochlorine

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Mirex	2385-85-5	39201	402	Insecticide	Organochlorine
Nonachlor	3734-49-4	44802	5448	Insecticide	Organochlorine
Oxychlordane	27304-13-8	NA 177	NA 177	Breakdown product	Organochlorine
Oxychlordane, mix of isomers	26880-48-8	NA 177	NA 177	Breakdown product	Organochlorine
Strobane	8001-50-1	20401	553	Insecticide	Organochlorine
Toxaphene	8001-35-2	80501	594	Insecticide	Organochlorine
trans-Nonachlor	39765-80-5	NA 177	NA 177	Insecticide	Organochlorine
(E)-Mevinphos	298-01-1	15802	NA 143	Insecticide	Organophosphorus
(Z)-Mevinphos	338-45-4	15803	NA 144	Insecticide	Organophosphorus
2,5-dichloro-alpha-(chloromethylene)benzyl diethyl phosphate	2701-86-2	#####	NA 116	Insecticide	Organophosphorus
2,5-dichloro-alpha-(dichloromethylene)benzyl diethyl phosphate	5723-62-6	#####	NA 116	Insecticide	Organophosphorus
Acephate	30560-19-1	#####	1685	Insecticide	Organophosphorus
Acethion	919-54-0	#####	NA 139	Insecticide	Organophosphorus
Acetoxon	2425-25-4	#####	NA 139	Insecticide, Breakdown product	Organophosphorus
Akton	1757-18-2	84901	1421	Insecticide	Organophosphorus
Akton, other related	NA 1131	NA 166	91421	Insecticide	Organophosphorus
alpha,alpha-Dithiol bis(O,O-dimethyl phosphorodithioate)toluene	2782-70-9	#####	NA 150	N/A	Organophosphorus
Amidithion	919-76-6	59601	NA 487	Insecticide	Organophosphorus
Amiton	78-53-5	57302	NA 473	Insecticide	Organophosphorus
Amiton oxalate	3734-97-2	57301	NA 472	Insecticide	Organophosphorus
Anilofos	64249-01-0	NA 202	NA 201	Insecticide	Organophosphorus
Athidathion	19691-80-6	#####	NA 141	Insecticide	Organophosphorus
Azamethiphos	35575-96-3	#####	NA 111	Insecticide	Organophosphorus
Azethion	72348-92-6	#####	NA 139	Insecticide	Organophosphorus
Azinphos-ethyl	2642-71-9	58002	4053	Insecticide	Organophosphorus
Azinphos-methyl	86-50-0	58001	314	Insecticide	Organophosphorus
Azinphos-methyl oxygen analog	NA 1057	NA 157	4054	Breakdown product	Organophosphorus
Azothoate	5834-96-8	#####	NA 118	Insecticide	Organophosphorus
Bensulide	741-58-2	9801	70	Herbicide	Organophosphorus
Bomyl	122-10-1	84201	77	Insecticide	Organophosphorus
Bromophos	2104-96-3	8706	NA 106	Insecticide	Organophosphorus
Bromophos-ethyl	4824-78-6	#####	NA 122	Insecticide	Organophosphorus
Butamifos	36335-67-8	NA 202	NA 201	Herbicide	Organophosphorus
Butathiofos	90338-20-8	#####	2433	Insecticide	Organophosphorus
Butonate	126-22-7	35701	255	N/A	Organophosphorus
Cadusafos	95465-99-9	#####	NA 14	Insecticide	Organophosphorus
Carbophenothion	786-19-6	58102	110	Insecticide	Organophosphorus
Chlorethoxyphos	54593-83-8	#####	5106	Insecticide	Organophosphorus
Chlorfenvinphos	470-90-6	84101	306	Insecticide	Organophosphorus
Chlormephos	24934-91-6	#####	NA 136	Insecticide	Organophosphorus
Chlorphoxim	14816-20-7	NA 207	NA 206	Insecticide	Organophosphorus
Chlorprazophos	36145-08-1	#####	NA 136	Insecticide	Organophosphorus
Chlorpyrifos	2921-88-2	59101	253	Insecticide, Nematicide	Organophosphorus
Chlorpyrifos oxygen analog	5598-15-2	59101	5034	Insecticide,	Organophosphorus

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Breakdown product	
Chlorpyrifos-methyl	5598-13-0	59102	2468	Insecticide	Organophosphorus
Chlorthion	500-28-7	34501	NA 300	Insecticide	Organophosphorus
Chlorthiophos	21923-23-9	#####	2469	Insecticide	Organophosphorus
Chlorthiophos	60238-56-4	#####	NA 919	Insecticide	Organophosphorus
Chlorthiophos II	77503-29-8	#####	NA 918	Insecticide	Organophosphorus
Chlorthiophos III	77503-28-7	#####	NA 917	Insecticide	Organophosphorus
cis-Azodrin	919-44-8	58902	NA 482	Insecticide	Organophosphorus
cis-Methocrotophos	69632-93-5	#####	NA 143	Insecticide	Organophosphorus
Coumaphos	56-72-4	36501	165	Insecticide	Organophosphorus
Coumaphos, other related	NA 1077	NA 161	90165	Insecticide	Organophosphorus
Coumithioate	572-48-5	#####	NA 141	Insecticide	Organophosphorus
Crotoxypfos	7700-17-6	58801	140	Insecticide	Organophosphorus
Crotoxypfos, other related	NA 1076	NA 161	90140	Insecticide	Organophosphorus
Cyanofenphos	13067-93-1	#####	NA 131	Insecticide	Organophosphorus
Cyanophos	2636-26-2	#####	NA 131	Insecticide	Organophosphorus
Cyanthoate	3734-95-0	#####	NA 131	Insecticide	Organophosphorus
Cythioate	115-93-5	59501	NA 486	Insecticide	Organophosphorus
DDVP	62-73-7	84001	187	Insecticide, Breakdown product	Organophosphorus
DDVP, other related	NA 1081	84001	90187	Insecticide	Organophosphorus
Demephion-O	682-80-4	#####	NA 143	Insecticide, Breakdown product	Organophosphorus
Demephion-S	2587-90-8	#####	NA 143	Insecticide	Organophosphorus
Demeton	8065-48-3	57601	566	Insecticide, Nematicide	Organophosphorus
Demeton-O	298-03-3	57602	NA 474	Insecticide	Organophosphorus
Demeton-O-methyl	867-27-6	58703	NA 480	Insecticide	Organophosphorus
Demeton-S	126-75-0	57603	NA 475	Insecticide	Organophosphorus
Demeton-S-methyl	919-86-8	NA 200	NA 200	Insecticide	Organophosphorus
Demeton-S-methyl (mixture)	8022-00-2	58701	4063	Insecticide	Organophosphorus
Demeton-S-methyl sulfone	17040-19-6	NA 183	NA 182	Breakdown product, Insecticide	Organophosphorus
Dequest 2010 phosphonate	NA 579	NA 105	2496	N/A	Organophosphorus
Dialifor	10311-84-9	#####	1799	Insecticide	Organophosphorus
Dialifor, other related	NA 1138	NA 167	91799	Insecticide	Organophosphorus
Diamidafos	1754-58-1	#####	NA 879	Insecticide, Nematicide	Organophosphorus
Diazinon	333-41-5	57801	198	Insecticide	Organophosphorus
Diazoxon	962-58-3	NA 156	4064	Breakdown product	Organophosphorus
Dichlofenthion	97-17-6	28601	614	Insecticide, Nematicide	Organophosphorus
Dicrotophos	141-66-2	35201	72	Insecticide	Organophosphorus
Dimethoate	60-51-5	35001	216	Insecticide	Organophosphorus
Dimethoate-ethyl	116-01-8	#####	NA 147	Insecticide	Organophosphorus
Dioxabenzofos	3811-49-2	#####	NA 112	Insecticide	Organophosphorus
Dioxathion	78-34-2	37801	192	Insecticide	Organophosphorus
Dioxathion, other related	NA 1083	NA 161	90192	Insecticide	Organophosphorus
Diphenprofos	59010-86-5	#####	NA 920	Insecticide	Organophosphorus
Disulfoton	298-04-4	32501	230	Insecticide, Nematicide	Organophosphorus

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Disulfoton sulfone	216746	#####	NA 140	Insecticide	Organophosphorus
Disulfoton sulfoxide	216777	#####	NA 140	Breakdown product	Organophosphorus
Ditalimfos	5131-24-8	#####	NA 891	Fungicide	Organophosphorus
DMCP	3309-87-3	#####	NA 119	Insecticide	Organophosphorus
Edifenphos	17109-49-8	#####	1964	Insecticide	Organophosphorus
Endothion	319315	#####	NA 146	Insecticide	Organophosphorus
EPBP	3792-59-4	#####	NA 155	Insecticide	Organophosphorus
EPN	2104-64-5	41801	263	Insecticide	Organophosphorus
Ethephon	16672-87-0	99801	1626	Plant Growth Regulator	Organophosphorus
Ethion	563-12-2	58401	268	Insecticide	Organophosphorus
Ethion, O-analog	17356-42-2	58402	NA 478	Breakdown product	Organophosphorus
Ethoprop	13194-48-4	41101	404	Insecticide, Nematicide	Organophosphorus
Ethyl (2-mercaptoethyl)carbamate, S-ester of O,O-dimethyl phosphorodithioate	5840-95-9	#####	NA 149	Insecticide	Organophosphorus
Ethyl hydrogen 1-propylphosphonate	21921-96-0	#####	NA 148	N/A	Organophosphorus
Etrinfos	38260-54-7	#####	NA 147	Insecticide	Organophosphorus
Famphur	52-85-7	59901	282	Insecticide	Organophosphorus
Famphur, O-analog	960-25-8	59902	NA 491	Breakdown product	Organophosphorus
Fenamiphos	22224-92-6	#####	1857	Insecticide, Nematicide	Organophosphorus
Fenamiphos sulfone	31972-44-8	NA 156	4070	Breakdown product	Organophosphorus
Fenamiphos sulfoxide	31972-43-7	NA 156	4071	Breakdown product	Organophosphorus
Fenitrothion	122-14-5	#####	2520	Insecticide	Organophosphorus
Fensulfothion	115-90-2	32701	181	Insecticide, Nematicide	Organophosphorus
Fenthion	55-38-9	53301	63	Insecticide, Avicide	Organophosphorus
Fenthion oxon	3254-63-5	#####	NA 143	Breakdown product	Organophosphorus
Fonofos	944-22-9	41701	254	Insecticide	Organophosphorus
Formothion	2540-82-1	#####	NA 143	Insecticide	Organophosphorus
Fosmethilan	83733-82-8	NA 208	NA 207	Insecticide	Organophosphorus
Fospirate	5598-52-7	#####	1856	Insecticide	Organophosphorus
Fosthiazate	98886-44-3	#####	NA 109	N/A	Organophosphorus
Fosthietan	21548-32-3	#####	NA 928	Fumigant, Nematicide	Organophosphorus
Heptenophos	23560-59-0	#####	NA 122	Insecticide	Organophosphorus
Hexylthiofos	41495-67-4	#####	NA 132	Insecticide	Organophosphorus
Iodofenfos	18181-70-9	#####	NA 138	Insecticide	Organophosphorus
Iprobenfos	26087-47-8	NA 203	NA 202	Fungicide	Organophosphorus
IPSP	1432970	NA 208	NA 207	Insecticide	Organophosphorus
Isazophos	42509-80-8	#####	2282	Insecticide	Organophosphorus
Isazophos-methyl	42509-83-1	#####	NA 136	Insecticide	Organophosphorus
Isocarbophos	24353-61-5	#####	2414	Insecticide	Organophosphorus
Isochlorthion	2463-84-5	34502	NA 301	Insecticide	Organophosphorus
Isofenphos	25311-71-1	#####	2194	Insecticide	Organophosphorus

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Isothioate	36614-38-7	NA 208	NA 207	Insecticide	Organophosphorus
Isoxathion	18854-01-8	57802	NA 476	Insecticide	Organophosphorus
Leptophos	21609-90-5	#####	1676	Insecticide	Organophosphorus
Leptophos, other related	NA 1135	NA 167	91676	Insecticide	Organophosphorus
Lythidathion	2669-32-1	#####	NA 147	Insecticide	Organophosphorus
Malaoxon	NA 1054	NA 156	4076	Breakdown product	Organophosphorus
Malathion	121-75-5	57701	367	Insecticide	Organophosphorus
Mecarbam	2595-54-2	#####	NA 140	Insecticide	Organophosphorus
Mecarphon	29173-31-7	#####	NA 156	Insecticide	Organophosphorus
Menazon	78-57-9	#####	NA 134	N/A	Organophosphorus
Mephosfolan	950-10-7	#####	NA 131	Insecticide	Organophosphorus
Merphos	150-50-5	74901	293	Defoliant, Plant Growth Regulator	Organophosphorus
Merphos, other related	NA 1088	NA 162	90293	Defoliant, Plant Growth Regulator	Organophosphorus
Merpofos	3568-56-7	#####	NA 129	N/A	Organophosphorus
Methacrifos	62610-77-9	NA 189	NA 188	Insecticide	Organophosphorus
Methamidophos	10265-92-6	#####	1697	Insecticide, Breakdown product	Organophosphorus
Methidathion	950-37-8	#####	1689	Insecticide	Organophosphorus
Methidathion OA	NA 1065	#####	5040	Insecticide	Organophosphorus
Methyl paraoxon	950-35-6	53502	4083	Breakdown product	Organophosphorus
Methyl parathion	298-00-0	53501	394	Insecticide, Nematicide	Organophosphorus
Methyl parathion, other related	NA 1094	NA 162	90394	Insecticide, Nematicide	Organophosphorus
Methyl phenkapton	3735-23-7	#####	NA 142	N/A	Organophosphorus
Methyl trithion	953-17-3	58101	3531	Insecticide	Organophosphorus
Methyl-carbofenthiion	NA 843	NA 157	4057	Insecticide	Organophosphorus
Mevinphos	7786-34-7	15801	480	Insecticide	Organophosphorus
Mevinphos (stereochemistry unspecified)	26718-65-0	NA 200	NA 200	Insecticide	Organophosphorus
Mevinphos, other related	NA 1103	NA 163	90480	Insecticide	Organophosphorus
Miral	42509-80-8	#####	2689	Insecticide	Organophosphorus
Monocrotophos	6923-22-4	58901	52	Insecticide	Organophosphorus
Morphothion	144-41-2	#####	NA 143	Insecticide	Organophosphorus
Naled	300-76-5	34401	418	Insecticide	Organophosphorus
Naphthalophos	1491-41-4	#####	NA 117	Insecticide	Organophosphorus
O,O,S-Trimethyl phosphorodithiate (as impurity)	2953-29-9	#####	NA 161	Impurity	Organophosphorus
O,O-diethyl O-naphthaloximido phosphorothioate	2668-92-0	#####	NA 138	Insecticide	Organophosphorus
O,O-diethyl phosphorochloridothionate	226542	NA 338	2508	Insecticide	Organophosphorus
O,O-Diethyl S-(4,6-dimethyl-2-pyrimidinyl) phosphorodithioate	333-40-4	#####	NA 140	Insecticide	Organophosphorus
O,O-diethyl-O-phenyl phosphorothioate	32345-29-2	NA 337	2507	Insecticide	Organophosphorus
O,O-dimethyl S-(2-	2674-91-1	58704	NA 481	Insecticide	Organophosphorus



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
(ethylsulfinyl)-1-methylethyl phosphorothioate					
O-(2-chloro-4-nitrophenyl) O-isopropyl ethylphosphonothioate	328-04-1	#####	NA 137	N/A	Organophosphorus
O-(4-Nitrophenyl) O-phenyl methylphosphonothioate	2665-30-7	#####	NA 158	N/A	Organophosphorus
O-ethyl O-(4-(methylthio)phenyl) methylphosphonothioate	2703-13-1	#####	NA 117	N/A	Organophosphorus
O-Ethyl S-(4-methylphenyl) ethylphosphonodithioate	333-43-7	#####	NA 149	N/A	Organophosphorus
O-Methyl 2-nitro-4-tolyl isopropylphosphoramidothioate Omethoate	36001-88-4	#####	NA 157	N/A	Organophosphorus
	1113-02-6	35002	2285	Insecticide, Breakdown product	Organophosphorus
Oxydemeton-methyl	301-12-2	58702	382	Insecticide	Organophosphorus
Paraoxon	311-45-5	NA 155	4082	Breakdown product	Organophosphorus
Parathion	56-38-2	57501	459	Insecticide	Organophosphorus
Parathion	56-38-2	57401	NA 174	Insecticide, Nematicide	Organophosphorus
Parathion, other related	NA 1099	NA 163	90459	Insecticide, Nematicide	Organophosphorus
Phenkapton	2275-14-1	#####	NA 139	Insecticide	Organophosphorus
Phenthoate	253180	#####	NA 889	Insecticide	Organophosphorus
Phorate	298-02-2	57201	478	Insecticide, Nematicide	Organophosphorus
Phorate sulfone	249924	NA 155	4084	Breakdown product	Organophosphorus
Phorate sulfoxide	249892	NA 155	4085	Breakdown product	Organophosphorus
Phoratoxon	2600-69-3	NA 155	4086	Breakdown product	Organophosphorus
Phoratoxon sulfone	NA 1051	NA 155	4087	Breakdown product	Organophosphorus
Phoratoxon sulfoxide	249955	NA 155	4088	Breakdown product	Organophosphorus
Phosalone	2310-17-0	97701	479	Insecticide	Organophosphorus
Phosalone OA	NA 1066	97701	5041	Insecticide, Breakdown product	Organophosphorus
Phosfolan	947-02-4	#####	NA 131	N/A	Organophosphorus
Phosmet	732-11-6	59201	335	Insecticide	Organophosphorus
Phosmetoxon	3735-33-9	59202	4089	Breakdown product	Organophosphorus
Phosnichlor	5826-76-6	34503	NA 302	Insecticide	Organophosphorus
Phosphamidon	13171-21-6	18201	482	Insecticide	Organophosphorus
Phosphamidon, other related	NA 1104	NA 163	90482	Insecticide	Organophosphorus
Phostebupirim	96182-53-5	#####	5122	Insecticide	Organophosphorus
Phoxim	14816-18-3	#####	NA 159	Insecticide	Organophosphorus
Phoxim-methyl	14816-16-1	#####	NA 159	Insecticide	Organophosphorus
Piperophos	24151-93-7	NA 219	NA 218	Herbicide	Organophosphorus
Pirimiphos ethyl	23505-41-1	#####	2781	Insecticide	Organophosphorus
Pirimiphos ethyl, O-analog	36378-61-7	#####	NA 899	Breakdown	Organophosphorus

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
				product	
Pirimiphos-methyl	29232-93-7	#####	2217	Insecticide	Organophosphorus
Primidophos	39247-96-6	#####	NA 127	Insecticide	Organophosphorus
Profenofos	41198-08-7	#####	2042	Insecticide	Organophosphorus
Propaphos	7292-16-2	NA 201	NA 201	Insecticide	Organophosphorus
Propetamphos	31218-83-4	#####	2122	Insecticide	Organophosphorus
Propoxon	5823-13-2	#####	NA 139	Insecticide	Organophosphorus
Prothidathion	20276-83-9	#####	NA 141	Insecticide	Organophosphorus
Prothiofos	34643-46-4	#####	4094	Insecticide	Organophosphorus
Prothion	5969-94-8	#####	NA 139	Insecticide	Organophosphorus
Prothoate	2275-18-5	#####	NA 140	Insecticide	Organophosphorus
Pyraclofos	77458-01-6	NA 183	NA 182	Insecticide	Organophosphorus
Pyrazophos	13457-18-6	#####	NA 149	Fungicide	Organophosphorus
Pyridiphenthion	119-12-0	53302	NA 450	Insecticide	Organophosphorus
Quinalphos	13593-03-8	#####	NA 145	Insecticide	Organophosphorus
Quinalphos-methyl	13593-08-3	#####	NA 145	Insecticide	Organophosphorus
Quinitofos	1776-83-6	#####	NA 149	Insecticide	Organophosphorus
Quinothion	22439-40-3	#####	NA 140	Insecticide	Organophosphorus
Ronnel	299-84-3	58301	517	Insecticide	Organophosphorus
S,S,S-tributyl phosphorotrithioate	78-48-8	74801	190	Defoliant, Plant Growth Regulator	Organophosphorus
S-(1,1-Dimethylethyl) O-ethyl ethylphosphonothioate	83318-76-7	#####	NA 104	Insecticide	Organophosphorus
S-(4-(1,1-dimethylethyl)phenyl) O-ethyl ethylphosphonodithioate	329-21-5	#####	NA 143	Insecticide	Organophosphorus
Sophamide	37032-15-8	#####	NA 144	Insecticide	Organophosphorus
Sulfotep	3689-24-5	79501	558	Insecticide	Organophosphorus
Sulfotep, other related	NA 1111	NA 164	90558	Insecticide	Organophosphorus
Sulprofos	35400-43-2	#####	2006	Insecticide	Organophosphorus
Sulprofos oxon	38527-90-1	#####	NA 125	Breakdown product	Organophosphorus
Temephos	3383-96-8	59001	1	Insecticide	Organophosphorus
Temephos sulfoxide	17210-55-8	59002	NA 483	Breakdown product	Organophosphorus
TEPP	107-49-3	79601	577	Insecticide	Organophosphorus
Terbufos	13071-79-9	#####	2925	Insecticide, Nematicide	Organophosphorus
Terbufos sulfone	56070-16-7	#####	NA 140	Breakdown product	Organophosphorus
Terbufos sulfoxide	10548-10-4	#####	NA 140	Breakdown product	Organophosphorus
Tetrachlorvinphos	22248-79-9	83702	305	Insecticide	Organophosphorus
Tetrachlorvinphos	961-11-5	83701	NA 34	Insecticide	Organophosphorus
Thiometon	640-15-3	#####	NA 149	Insecticide	Organophosphorus
Thionazin	297-97-2	32401	2939	Insecticide	Organophosphorus
Thionazin, O-analog	7359-55-9	32402	NA 297	Insecticide, Breakdown product	Organophosphorus
Tolclofos-methyl	57018-04-9	#####	NA 106	Fungicide	Organophosphorus
Triazophos	24017-47-8	#####	3543	Insecticide	Organophosphorus
Trichlorfon	52-68-6	57901	88	Insecticide	Organophosphorus
Trichloronat	327-98-0	#####	5001	Insecticide	Organophosphorus
Vamidothion	2275-23-2	#####	3544	Insecticide	Organophosphorus
3-iodo-2-propynyl butyl	55406-53-6	#####	1938	Fungicide,	Other Carbamate

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
carbamate				Wood Preservative	
6-Methyl-2-propyl-4-pyrimidinyl dimethylcarbamate	2532-49-2	#####	NA 157	N/A	Other Carbamate
Alanycarb	83130-01-2	NA 175	NA 47	Insecticide	Other Carbamate
Asulam	3337-71-1	#####	5076	Herbicide	Other Carbamate
Asulam, sodium salt	2302-17-2	#####	1746	Herbicide	Other Carbamate
Benfuracarb	82560-54-1	#####	NA 48	Insecticide	Other Carbamate
Chlorbufam	1967-16-4	#####	NA 157	Herbicide	Other Carbamate
Chlorprocarb	23121-99-5	#####	NA 136	Herbicide	Other Carbamate
Chlorpropham	101-21-3	18301	141	Herbicide, Plant Growth Regulator	Other Carbamate
Diethofencarb	87130-20-9	NA 184	NA 183	Fungicide	Other Carbamate
Dimetan	122-15-6	#####	NA 112	Insecticide	Other Carbamate
Dimetilan	644-64-4	90101	NA 844	Insecticide	Other Carbamate
Fenoxycarb	79127-80-3	#####	2283	Insecticide, Insect Growth Regulator	Other Carbamate
Fenoxycarb	72490-01-8	NA 228	NA 228	Insecticide, Insect Growth Regulator	Other Carbamate
Isolan	119-38-0	#####	NA 155	Insecticide	Other Carbamate
Karbutilate	4849-32-5	97401	691	Herbicide	Other Carbamate
Mecarbinizid	27386-64-7	#####	NA 157	N/A	Other Carbamate
Nitrilacarb	29672-19-3	#####	NA 129	Insecticide	Other Carbamate
Potassium asulam	14089-43-1	#####	NA 893	Herbicide	Other Carbamate
Propamocarb	24579-73-5	#####	2147	Fungicide	Other Carbamate
Propamocarb hydrochloride	25606-41-1	#####	4022	Fungicide	Other Carbamate
Propham	122-42-9	47601	339	Herbicide, Plant Growth Regulator	Other Carbamate
Pyrolan	87-47-8	#####	NA 157	Insecticide	Other Carbamate
Swep	1918-18-9	84601	4098	N/A	Other Carbamate
Chlorfenapyr	122453-73-0	#####	3938	Insecticide	Pyrazole
Pyrazoxyfen	71561-11-0	NA 189	NA 189	Herbicide	Pyrazole
Tebufenpyrad	119168-77-3	90102	NA 845	Insecticide	Pyrazole
(+)-cis,trans-Deltamethrin	120710-23-8	#####	NA 120	Insecticide	Pyrethroid
(+)-cis-Permethrin	52341-33-0	#####	NA 120	Insecticide	Pyrethroid
(S)-Cypermethrin	66841-24-5	#####	3866	Insecticide	Pyrethroid
6-chloropiperonyl 2,2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylate	70-43-9	#####	NA 124	Insecticide	Pyrethroid
Acrinathrin	101007-06-1	#####	NA 4	Insecticide	Pyrethroid
Allethrin	584-79-2	4001	12	Insecticide	Pyrethroid
Allethrin Coil	NA 1163	4002	NA 163	Insecticide	Pyrethroid
Allethrin, other related	NA 1070	NA 160	90012	Insecticide	Pyrethroid
B-fenvalerate	66267-77-4	#####	NA 903	Insecticide	Pyrethroid
Beta-cyfluthrin	68359-37-5	#####	3956	Insecticide	Pyrethroid
Bifenthrin	82657-04-3	#####	2300	Insecticide	Pyrethroid
Bioresmethrin	28434-01-7	97802	NA 855	Insecticide	Pyrethroid
Cismethrin	35764-59-1	97804	NA 857	Insecticide	Pyrethroid
Cyclethrin	97-11-0	4052	NA 69	N/A	Pyrethroid
Cycloprothrin	63935-38-6	NA 204	NA 203	Insecticide	Pyrethroid
Cyfluthrin	68359-37-5	#####	2223	Insecticide	Pyrethroid

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Cyhalothrin	68085-85-8	#####	NA 104	Insecticide	Pyrethroid
Cypermethrin (stereochemistry unspecified)	52315-07-8	#####	NA 172	Insecticide	Pyrethroid
Cypermethrin, alpha	67375-30-8	#####	NA 120	Insecticide	Pyrethroid
Cypermethrin, beta	65731-84-2	#####	2171	Insecticide	Pyrethroid
Cypermethrin, theta	71697-59-1	NA 200	NA 199	Insecticide	Pyrethroid
Cyphenothrin	39515-40-7	#####	3885	Insecticide	Pyrethroid
D-Allethrin	42534-61-2	4005	2293	Insecticide	Pyrethroid
D-allethrin, other related	NA 1151	NA 168	92293	Insecticide	Pyrethroid
D-cis-trans Allethrin	42534-61-2	4005	NA 163	Insecticide	Pyrethroid
D-trans Allethrin	28057-48-9	4003	4038	Insecticide	Pyrethroid
D-trans allethrin, other related	NA 1154	NA 173	94038	Insecticide	Pyrethroid
Deltamethrin	52918-63-5	97805	3010	Insecticide	Pyrethroid
Deltamethrin (isomer unspecified)	52820-00-5	#####	NA 120	Insecticide	Pyrethroid
Deltamethrin, other related	NA 1153	NA 169	93010	Insecticide	Pyrethroid
Dimethrin	70-38-2	34101	NA 299	Insecticide	Pyrethroid
Empenthrin [(1R)isomers]	54406-48-3	NA 202	NA 202	Insecticide	Pyrethroid
Esbiothrin	28434-00-6	4004	4040	Insecticide	Pyrethroid
Esfenvalerate	66230-04-4	#####	2321	Insecticide	Pyrethroid
Fenpropathrin	39515-41-8	#####	2234	Insecticide	Pyrethroid
Fenpropathrin	64257-84-7	NA 201	NA 200	Insecticide	Pyrethroid
Fenvalerate	51630-58-1	#####	1963	Insecticide	Pyrethroid
Fenvalerate	51630-58-1	#####	NA 173	Insecticide	Pyrethroid
Fenvalerate, other related	NA 1143	NA 167	91963	Insecticide	Pyrethroid
Flucythrinate	70124-77-5	#####	2168	Insecticide	Pyrethroid
Flumethrin	69770-45-2	NA 219	NA 218	Insecticide	Pyrethroid
Fluvalinate (stereochemistry unspecified)	69409-94-5	#####	2195	Insecticide	Pyrethroid
Furethrin	17080-02-3	#####	NA 150	Insecticide	Pyrethroid
Halfenprox	111872-58-3	NA 189	NA 188	Insecticide	Pyrethroid
Imiprothrin	72963-72-5	4006	5327	Insecticide	Pyrethroid
Lambda cyhalothrin	91465-08-6	#####	2297	Insecticide	Pyrethroid
Permethrin	52645-53-1	#####	2008	Insecticide	Pyrethroid
Permethrin, other related	NA 1146	NA 168	92008	Insecticide	Pyrethroid
Phenothrin	26002-80-2	69005	2093	Insecticide	Pyrethroid
Phenothrin, other related	NA 1147	NA 168	92093	Insecticide	Pyrethroid
Prallethrin	23031-36-9	#####	3985	Insecticide	Pyrethroid
Pyrethrins and pyrethroids, manufg. Residues	68648-44-2	69007	NA 611	Insecticide	Pyrethroid
Resmethrin	10453-86-8	97801	2119	Insecticide	Pyrethroid
Resmethrin, other related	NA 1148	NA 168	92119	Insecticide	Pyrethroid
S-Bioallethrin	28434-00-6	4004	4039	Insecticide	Pyrethroid
Tau-fluvalinate	102851-06-9	NA 201	NA 200	Insecticide	Pyrethroid
Tefluthrin	79538-32-2	#####	3839	Insecticide	Pyrethroid
Tetramethrin	7696-12-0	69003	1695	Insecticide	Pyrethroid
Tetramethrin, other related	NA 1137	NA 167	91695	Insecticide	Pyrethroid
Tralomethrin	66841-25-6	#####	2329	Insecticide	Pyrethroid
Transfluthrin	118712-89-3	NA 206	NA 205	Insecticide	Pyrethroid
(Poly-N-acetyl--D-glucosamine)-protein	9012-76-4	#####	2792	Plant Growth Regulator, Fungicide	Animal derived
Ammoniated caseinate	9005-42-9	NA 539	3579	N/A	Animal derived
Androsterone	53-41-8	#####	NA 101	Deer Repellent	Animal derived

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Animal gland extracts	NA 63	NA 118	1345	Rodenticide	Animal derived
Animal glue	NA 792	NA 147	3581	Rodenticide, Bird Repellent	Animal derived
Beef fat	NA 637	NA 117	3585	Bait	Animal derived
Bone meal	NA 584	NA 106	3589	N/A	Animal derived
Bone oil	8001-85-2	10801	78	Dog and Cat Repellent	Animal derived
Calcium salts of casein and soy	NA 665	NA 123	1252	N/A	Animal derived
Casein	9000-71-9	NA 152	1075	N/A	Animal derived
Cat food	NA 796	NA 147	3602	Bait	Animal derived
Cheese	NA 222	NA 429	3604	Bait	Animal derived
Chitin	1398-61-4	#####	NA 109	Nematicide	Animal derived
Clam shells	NA 797	NA 147	3611	N/A	Animal derived
Cod liver oil	8001-69-2	31609	2250	N/A	Animal derived
Dried blood	68911-49-9	611	1315	Dog and Cat Repellent	Animal derived
Dry milk solids	NA 149	NA 284	1976	N/A	Animal derived
Egg shells	NA 141	NA 275	3649	N/A	Animal derived
Eggs	NA 802	NA 148	3648	N/A	Animal derived
Elanco empty gelatin capsules	NA 142	NA 276	2543	N/A	Animal derived
Fish meal	NA 123	NA 237	2571	N/A	Animal derived
Fish oil	8016-13-5	#####	3658	Adjuvant, Deer Repellent, Dog and Cat Repellent	Animal derived
Game repellent	NA 1490	NA 221	NA 221	Deer Repellent	Animal derived
Gardol	137-16-6	174	3210	Dog and Cat Repellent	Animal derived
Gelatin	9000-70-8	NA 222	3660	Insecticide	Animal derived
Gelatin capsules, R.P. Scherer	NA 574	NA 104	2577	N/A	Animal derived
Hydrolyzed proteins	NA 1355	NA 192	NA 192	Bait	Animal derived
Jaguar	NA 76	NA 147	2146	Deer Repellent	Animal derived
Lard	61789-99-9	NA 143	3675	N/A	Animal derived
Lion waste	NA 571	NA 103	1301	Deer Repellent	Animal derived
Meat	NA 53	NA 100	3681	Bait	Animal derived
Meat meal	NA 570	#####	3682	Bait, Deer Repellent, Dog and Cat Repellent	Animal derived
Meat scraps	NA 54	NA 101	3683	Bait	Animal derived
Meat stock, Hormel #6	NA 618	NA 112	2670	Bait	Animal derived
Milk	8049-98-7	NA 64	3564	N/A	Animal derived
Nutria meat	NA 24	NA 36	3702	Bait	Animal derived
Oil of mink	NA 10	NA 14	1961	N/A	Animal derived
Oyster shells	NA 808	NA 149	3714	N/A	Animal derived
Pig tasties	NA 594	NA 107	3730	N/A	Animal derived
Powdered gelatin	NA 760	NA 137	2827	N/A	Animal derived
Putrescent whole egg solids	51609-52-0	#####	1935	Insecticide, Deer Repellent	Animal derived
Shellac	9000-59-3	NA 109	3378	N/A	Animal derived
Silkworm pupae	NA 464	NA 828	2855	N/A	Animal derived
Sodium caseinate	9005-46-3	NA 836	3389	N/A	Animal derived
Sperm oil	8002-24-2	99701	NA 868	N/A	Animal derived
Whey	NA 560	NA 101	3825	N/A	Animal derived

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Wool	NA 566	NA 102	3826	N/A	Animal derived
(-)-.alpha.-Cubebene	17699-14-8	#####	NA 130	Insecticide	Botanical
(7S)-Hydroprene	65733-18-8	#####	NA 107	Insect Growth Regulator	Botanical
1-naphthaleneacetamide (NAD)	86-86-2	56001	422	Plant Growth Regulator	Botanical, Naphthalene acetic acid derivati
2-methoxy-5-nitro phenol, sodium salt	67233-85-6	#####	5117	Plant Growth Regulator	Botanical
2-Naphthyloxyacetamide	NA 1401	NA 197	NA 196	Plant Growth Regulator, Herbicide	Naphthalene acetic acid derivati, Botanical
3,7-dimethyl-6-octanol	106-22-9	NA 129	2140	Insect Repellent	Botanical
3,7-dimethyl-6-octen-1-ol acetate	150-84-5	NA 307	2522	Insect Repellent	Botanical
Acacia	2591766	NA 696	2346	N/A	Botanical
Alfalfa	NA 635	NA 116	3569	N/A	Botanical
Alfalfa meal	NA 393	NA 714	3570	N/A	Botanical
Algin	9005-38-3	NA 715	3571	N/A	Botanical
Almond hulls	NA 280	NA 547	3577	N/A	Botanical
Almond shells	NA 636	NA 117	3578	N/A	Botanical
Alpha-ionone	127-41-3	#####	1518	Dog and Cat Repellent	Botanical
Alpha-pinene polymer	31393-98-3	NA 153	3996	Insecticide	Botanical
Amycol potato alpha starch	NA 272	NA 527	2387	N/A	Botanical
Apple pomace	NA 262	NA 517	3582	N/A	Botanical
Avermectin	71751-41-2	#####	2254	Insecticide	Botanical
Avermectin B1	65195-55-3	#####	NA 165	Insecticide	Botanical
Avermectin, other related	NA 1156	NA 174	92254	Insecticide	Botanical
Azadirachtin	11141-17-6	#####	2328	Insecticide, Nematicide	Botanical
Azadirachtin B	95507-03-2	#####	NA 989	Insecticide	Botanical
Balsam peru	NA 660	NA 122	1146	N/A	Botanical
Barley straw	NA 873	NA 160	5138	N/A	Botanical
Beeswax (yellow and white)	NA 245	NA 494	3586	N/A	Botanical
Beet powder	NA 246	NA 495	3587	N/A	Botanical
Beta-caryophyllene	87-44-5	NA 439	2188	N/A	Botanical
Beta-pinene polymer	68240-09-5	NA 153	3998	Insecticide	Botanical
Bran	NA 638	NA 117	3590	N/A	Botanical
Bread crumbs	NA 793	NA 147	3591	Bait	Botanical
Buffalo gourd root powder	NA 238	NA 475	3928	N/A	Botanical
Calf's Milk Replacer	NA 1320	NA 177	5741	N/A	Botanical
Canary seed	NA 583	NA 105	3597	Bait	Botanical
Capsicum oleoresin	404-86-4	70701	470	Insecticide	Botanical
Cardboard	NA 795	NA 147	3599	N/A	Botanical
Carrageenan	2591943	NA 437	3600	Adjuvant	Botanical
Carrots	NA 226	NA 438	3601	N/A	Botanical
Chlorophyllin	11006-34-1	NA 191	NA 190	Fungicide, Microbiocide	Inorganic-Copper, Botanical
Cinerin I	25402-06-6	69009	NA 612	Insecticide	Botanical
Cinerin II	121-20-0	69010	NA 613	Insecticide	Botanical
Cinnamaldehyde	104-55-2	40506	2277	Dog and Cat Repellent,	Botanical

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				Fungicide, Dog and Cat Repellent	
Cinnamon	NA 217	#####	3607	Insecticide	Botanical
cis-Zeatin	NA 1342	NA 191	NA 190	Plant Growth Regulator	Botanical
Citronellal	106-23-0	NA 223	NA 223	Insect Repellent	Botanical
Citronellol	106-22-9	NA 306	2139	Insecticide	Botanical
Citrus extract	NA 1457	NA 216	NA 215	N/A	Botanical
Citrus meal	NA 214	NA 407	3608	N/A	Botanical
Citrus pectin	NA 215	NA 408	3609	N/A	Botanical
Citrus pulp	NA 216	NA 409	3610	N/A	Botanical
Clarified hydrophobic extract of neem oil	8002-65-1	25006	3979	Insecticide	Botanical
Clarified hydrophobic neem oil	8002-65-1	25007	NA 172	Insecticide	Botanical
Cloves, Crushed	NA 962	#####	2333	Insecticide	Botanical
Coco shell flour	NA 200	NA 392	3617	N/A	Botanical
Cocoa	NA 207	NA 398	3613	N/A	Botanical
Cocoa shells	NA 640	NA 117	3614	N/A	Botanical
Coffee grounds	NA 581	NA 105	3619	N/A	Botanical
Components of etheric oils of plant origin	NA 1360	NA 193	NA 192	Insecticide	Botanical
Cork	NA 798	NA 147	3622	N/A	Botanical
Corn	NA 879	NA 169	5144	Bait	Botanical
Corn cobs	NA 193	NA 383	3624	N/A	Botanical
Corn flour	NA 799	NA 147	3625	N/A	Botanical
Corn gluten meal	66071-96-3	#####	2481	Herbicide	Botanical
Corn product, hydrolyzed	NA 710	NA 130	2322	Herbicide	Botanical
Cotton	NA 188	NA 376	3629	N/A	Botanical
Cotton fibre cord	NA 189	NA 377	2482	N/A	Botanical
Cottonseed flour	12751-36-9	NA 129	2078	N/A	Botanical
Cottonseed meal	NA 190	NA 378	3630	N/A	Botanical
Cracked oats	NA 801	NA 148	3632	Bait	Botanical
Cracked wheat	NA 192	NA 380	3633	Bait	Botanical
Creosote, wood	8021-39-4	25002	NA 202	Wood Preservative	Botanical
Cube extracts	NA 958	71004	756	Insecticide	Botanical
Cytokinin	525-79-1	#####	2082	Plant Growth Regulator	Botanical
Cytokinin (as kinetin)	525-79-1	#####	NA 172	Plant Growth Regulator	Botanical
Daphne oil	NA 1354	NA 192	NA 192	Insect Repellent	Botanical
Derris resins other than rotenone	NA 1260	71001	NA 172	Insecticide	Botanical
Desmodium	NA 1560	NA 227	NA 227	Insecticide	Botanical
Digitalis	71-63-6	97002	NA 850	N/A	Botanical
Digitalis	1339-93-1	97002	NA 851	N/A	Botanical
Dihydroazadirachtin	108189-58-8	#####	3994	Insecticide, Nematicide	Botanical
DMN	571-58-4	55802	5067	Plant Growth Regulator	Botanical
Douglas fir bark, ground	NA 156	NA 292	3647	N/A	Botanical

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Emamectin, benzoate	137512-74-4	#####	4020	Insecticide	Botanical
Ethylene glycol ether of pinene	53404-49-2	42101	NA 363	Insecticide	Botanical
Eugenol	97-53-0	#####	2095	Pheromone, Fragrance, Dog and Cat Repellent, Insecticide, Insect Repellent	Botanical
Fenugreek	NA 121	NA 234	3657	N/A	Botanical
Flour	NA 120	NA 232	3659	N/A	Botanical
Flowers of Chamomile (Matricaria chamomilla and/or Anthemidis nobilis)	NA 1267	#####	NA 173	Insecticide	Botanical
Folic acid	59-30-3	NA 191	NA 190	Plant Growth Regulator	Botanical
Garlic	8000-78-0	#####	2213	Insecticide	Botanical
Geraniol	106-24-1	#####	309	Pheromone, Fragrance, Insecticide, Insect Repellent, Dog and Cat Repellent	Botanical
Gibberellic acid, 2-butoxyethyl ester	6550-86-3	43803	NA 371	Plant Growth Regulator	Botanical
Gibberellin A4 mixt. With gibberellin A7	8030-53-3	#####	NA 952	Plant Growth Regulator	Botanical
Gibberellins	77-06-5	43801	310	Plant Growth Regulator	Botanical
Gibberellins, potassium salt	125-67-7	43802	771	Plant Growth Regulator	Botanical
Grape pomace	NA 880	NA 169	5145	N/A	Botanical
Griseofulvin	126-07-8	#####	NA 150	N/A	Botanical
Ground corn cobs	NA 732	NA 133	2583	N/A	Botanical
Ground oats	NA 804	NA 148	3664	Bait	Botanical
Ground rice hulls	NA 108	NA 212	2584	N/A	Botanical
Ground sesame plant	NA 109	#####	2585	Insecticide, Nematicide	Botanical
Guar gum	9000-30-0	NA 103	3666	Adjuvant	Botanical
Gum resins	9000-75-3	99401	NA 866	Adjuvant	Botanical
Gum Thus	2244967	84502	NA 834	Adjuvant	Botanical
Gum tragacanth	9000-65-1	NA 213	3218	Adjuvant	Botanical
Hearts of corn flour	NA 573	NA 104	3667	N/A	Botanical
Hellebore alkaloids	1399-70-8	2001	NA 65	N/A	Botanical
Humic acid	1415-93-6	NA 134	2597	N/A	Botanical
Hydroprene	41096-46-2	#####	2244	Insect Growth Regulator	Botanical
Indole	120-72-9	25000	2614	Insecticide, Insect Repellent, Dog and Cat Repellent	Botanical
Indole-3-acetic acid	87-51-4	#####	NA 106	Plant Growth Regulator	Botanical



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Jasmolin I	4466-14-2	69011	NA 614	Insecticide	Botanical
Jasmolin II	1172-63-0	69012	NA 615	Insecticide	Botanical
Juniper tar oil	2231543	67203	NA 575	Insecticide	Botanical
Juniperus communis ext.	84603-69-0	67212	NA 582	Insecticide	Botanical
Larkspur alkaloid	41710-20-7	2202	NA 66	N/A	Botanical
Leaves of Eucalyptus	NA 1277	#####	NA 174	Insecticide	Botanical
Leaves of Pennyroyal (Mentha pulegium)	NA 1278	#####	NA 174	Insecticide	Botanical
Lignin	NA 73	NA 140	2640	N/A	Botanical
Lilacin	118-34-3	67006	NA 573	N/A	Botanical
Linalool	78-70-6	#####	2239	Insecticide, Insect Repellent, Fragrance	Botanical
Locust bean gum	NA 738	NA 134	2647	Adjuvant	Botanical
Medicated feed	NA 644	NA 118	3685	N/A	Botanical
Millet seed	NA 38	NA 65	3692	Bait	Botanical
Mint Herbs	NA 1280	#####	NA 174	Insecticide	Botanical
Montok pepper	NA 851	NA 158	5012	Insecticide	Botanical
Myrica cerifera, extract	84929-34-0	#####	NA 123	N/A	Botanical
N6-Benzyladenine, mixt. with Gibberellins A4 and A7	53663-71-1	#####	NA 953	Plant Growth Regulator	Botanical
NAA	86-87-3	56002	423	Plant Growth Regulator	Naphthalene acetic acid derivati, Botanical
NAA, ethyl ester	2122-70-5	56008	749	Plant Growth Regulator	Naphthalene acetic acid derivati, Botanical
Nicotine	54-11-5	56702	75	Insecticide	Botanical
Nicotine sulfate	65-30-5	56703	430	Insecticide	Botanical
NOA	120-23-0	55601	432	Plant Growth Regulator	Naphthalene acetic acid derivati, Botanical
Nonanoic acid	112-05-0	#####	2739	Herbicide, Fungicide	Botanical
Oatmeal	NA 806	NA 149	3704	Bait	Botanical
Oats	NA 16	NA 26	3705	Bait	Botanical
Oil of cedarwood	8000-27-9	40505	1011	Insecticide, Fungicide	Botanical
Oil of hardwood	NA 675	67201	1639	Microbiocide	Botanical
Oil of pine tar	2227495	67002	2246	Insecticide, Microbiocide	Botanical
Oils, cedarwood, Texan	68990-83-0	11524	NA 118	Insecticide, Fungicide	Botanical
Onion extract	NA 1349	NA 192	NA 191	N/A	Botanical
Onions	NA 807	NA 149	3711	N/A	Botanical
Orange pulp	NA 9	NA 13	3712	N/A	Botanical
p-Menthane-3,8-diol	42822-86-6	11550	5255	Insect Repellent	Botanical
Paloja	9000-28-6	#####	NA 880	N/A	Botanical
Papain	9001-73-4	NA 149	3717	Rodenticide	Botanical
Paper	NA 598	NA 107	3718	N/A	Botanical
Paprika	NA 383	NA 692	3719	N/A	Botanical
Peanut butter	NA 373	NA 681	2735	Bait	Botanical
Peanut shells	NA 375	NA 683	3723	N/A	Botanical

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Peanuts	NA 374	NA 682	3533	Bait	Botanical
Peat moss	NA 809	NA 149	3724	N/A	Botanical
Pecan shell flour	NA 376	NA 684	3725	N/A	Botanical
Pectin	9000-69-5	NA 118	3726	N/A	Botanical
Pepper	NA 1348	NA 192	NA 191	Insecticide, Deer Repellent	Botanical
Peppermint	NA 365	NA 668	2332	Insecticide, Fragrance	Botanical
Phenylethyl propionate	122-70-3	#####	2094	Fragrance, Pheromone, Insecticide, Insect Repellent, Dog and Cat Repellent	Botanical
Pine oil	2227495	67002	485	Insecticide, Microbiocide	Botanical
Pine soap	NA 1032	NA 127	1993	Insecticide, Microbiocide	Botanical
Pine tar	8011-48-1	67204	1574	Insecticide, Microbiocide	Botanical
Pine tar oil	91995-59-4	67205	NA 576	Insecticide, Microbiocide	Botanical
Pinene	80-56-8	67004	2187	Insecticide	Botanical
Pinene	1330-16-1	67001	NA 572	Insecticide	Botanical
Plant carbolineums	NA 1454	NA 215	NA 215	Insecticide, Fungicide	Botanical
Plant extract (derived from Quercus falcata, Opuntia lindheimeri, Rhus aromatica, and Rhizophoria mangle tissues)	NA 917	#####	5453	Nematicide	Botanical
Polymerized pinene	NA 399	NA 722	2043	Insecticide	Botanical
Potatoes	NA 436	NA 786	3772	N/A	Botanical
Poultry feed	NA 437	NA 787	3773	N/A	Botanical
Pyrethrin coils	NA 1165	69004	NA 164	Insecticide	Botanical
Pyrethrin I	121-21-1	NA 213	NA 213	Insecticide	Botanical
Pyrethrin II	121-29-9	69006	NA 610	Insecticide	Botanical
Pyrethrins	8003-34-7	69001	510	Insecticide	Botanical
Pyrethrins, other related	NA 1108	NA 164	90510	Insecticide	Botanical
Pyrethrum narc	NA 1000	69000	1461	Insecticide	Botanical
Pyrethrum powder other than pyrethrins	8003-34-7	69002	NA 164	Insecticide	Botanical
Quassia	NA 450	NA 806	3778	Insecticide	Botanical
Quillaja	68990-67-0	NA 150	3779	N/A	Botanical
Raisins	NA 647	NA 119	3780	Bait	Botanical
Red dog flour	NA 452	NA 811	3782	N/A	Botanical
Red pepper	NA 107	70703	1094	Dog and Cat Repellent	Botanical
Red squill glycoside	507-60-8	70801	514	Rodenticide	Botanical
Repellants (by smell) of animal or plant origin	NA 1373	NA 194	NA 193	Dog and Cat Repellent, Deer Repellent	Botanical
Resins, oleo-, capsicum	8023-77-6	70704	NA 665	Insecticide	Botanical
Rice	NA 812	NA 150	3783	N/A	Botanical

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Rice hulls	NA 813	NA 150	3784	N/A	Botanical
Rosemary	NA 453	#####	2331	N/A	Botanical
Rosin	9014-63-5	NA 812	3785	N/A	Botanical
Rosin oil	8002-16-2	40508	NA 341	N/A	Botanical
Rosin, partially dimerized	NA 454	NA 813	3786	N/A	Botanical
Rosin, partially hydrogenated	65997-06-0	NA 150	3787	N/A	Botanical
Rotenone	83-79-4	71003	518	Insecticide	Botanical
Rotenone, other related	NA 1109	NA 164	90518	Insecticide	Botanical
Rubber	2594048	NA 814	3788	N/A	Botanical
Ryanodine	NA 1305	71502	NA 175	Insecticide	Botanical
Ryanodine alkaloid	15662-33-6	71501	520	Insecticide	Botanical
Rye flour	NA 648	NA 119	3789	N/A	Botanical
Sabadilla alkaloids	2245180	2201	521	Insecticide	Botanical
Safrole	94-59-7	97901	3376	N/A	Botanical
Saponin	8047-15-2	97004	5033	N/A	Botanical
Sawdust	NA 1306	#####	1316	Adjuvant	Botanical
Scratch feed	NA 649	NA 119	3792	N/A	Botanical
Sea-algae extract	NA 1352	NA 192	NA 191	Plant Growth Regulator, Adjuvant	Botanical
Seaweed	NA 814	NA 150	3793	N/A	Botanical
Sodium 2-nitrophenoxide	824-39-5	#####	5118	Plant Growth Regulator	Botanical
Sodium 4-nitrophenoxide	824-78-2	#####	5119	Plant Growth Regulator	Botanical
Sorghum, grain	NA 478	NA 882	3904	N/A	Botanical
Soy flour	NA 482	NA 886	3809	N/A	Botanical
Soy protein	NA 483	NA 887	3810	N/A	Botanical
Soybean extract	NA 1353	NA 192	NA 191	N/A	Botanical
Soybean hulls	NA 481	NA 885	3807	N/A	Botanical
Soybean meal	NA 817	NA 150	3808	N/A	Botanical
Squalane	111-01-3	45503	2887	N/A	Botanical
Sugarbeet meal	NA 499	NA 910	3813	N/A	Botanical
Sunflower seeds	NA 650	NA 119	3815	Bait	Botanical
Synthetic vegetable gums	9004-64-2	NA 921	1835	Adjuvant	Botanical
Tall oil	8002-26-4	67211	2912	Adjuvant	Botanical
Tall oil acids	61790-12-3	NA 124	1389	Adjuvant	Botanical
Tar oils, from distillation of wood tar	8002-29-7	67202	NA 574	Insecticide, Herbicide	Botanical
Thuringiensin, calcium technical	23526-02-5	6404	2941	Insecticide	Botanical
Thyme	NA 527	#####	2330	Insect Repellent, Insecticide	Botanical
Tobacco	NA 1011	NA 959	3932	Insecticide	Botanical
Tobacco dust	8037-19-2	56704	NA 469	Insecticide	Botanical
Trimethoxybenzene	135-77-3	40515	5064	Insecticide, Insect Repellent, Dog and Cat Repellent	Botanical
Tung oil	NA 547	NA 997	3821	N/A	Botanical
Verbenone	1196-01-6	#####	NA 108	Insect Repellent	Botanical

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Walnut flour	NA 555	NA 101	3823	N/A	Botanical
Walnut shells, ground	NA 556	NA 101	2986	N/A	Botanical
Wheat	NA 819	NA 151	3824	N/A	Botanical
Wheat flour	NA 674	NA 125	1577	N/A	Botanical
White pepper	NA 1311	NA 178	NA 177	Insecticide	Botanical
Wood powder	NA 565	NA 102	1463	N/A	Botanical
Wood rosin	2245031	67208	NA 579	N/A	Botanical
Wood tar	91722-33-7	67206	NA 577	Insecticide	Botanical
Xanthan gum	11138-66-2	NA 102	2272	Adjuvant	Botanical
Agrobacterium radiobacter var radiobacter	NA 1435	NA 211	NA 210	Fungicide	Microbial
Agrobacterium radiobacter	NA 693	NA 127	1984	Fungicide	Microbial
Agrobacterium radiobacter (strain K84)	NA 925	#####	NA 167	Fungicide	Microbial
Agrobacterium radiobacter strain K1026	NA 921	6474	5477	Fungicide	Microbial
Agrobacterium vitis	NA 1536	NA 224	NA 224	Fungicide	Microbial
Agrotis segetum granulosis virus	NA 1391	NA 196	NA 195	Insecticide	Microbial
Ampelomyces quisqualis	NA 270	NA 525	2385	Fungicide	Microbial
Ampelomyces quisqualis isolate M-10	NA 1217	21007	NA 170	Fungicide	Microbial
Anagrapha falcifera multi-nuclear polyhedrosis virus (AFMNPV)	NA 862	#####	5089	Insecticide	Microbial
Aschersonia aleyrodis	NA 1392	NA 196	NA 195	Insecticide	Microbial
Bacillus cereus strain UW85	NA 1218	#####	NA 170	Plant Growth Regulator	Microbial
Bacillus cereus, strain BP01	NA 903	NA 172	5183	Insecticide	Microbial
Bacillus popilliae	NA 257	NA 509	2183	Fungicide	Microbial
Bacillus popilliae and B. lentimorbus	NA 1219	54501	NA 170	Fungicide	Microbial
Bacillus sphaericus	143447-72-7	#####	2274	Insecticide	Microbial
Bacillus sphaericus, serotype H-5A5B, strain 2362	143447-72-7	#####	2409	Insecticide	Microbial
Bacillus subtilis GBO3	NA 855	#####	3945	Fungicide	Microbial
Bacillus subtilis isolate B246	NA 1538	NA 225	NA 224	Fungicide	Microbial
Bacillus subtilis MBI 600	NA 864	#####	5120	Fungicide	Microbial
Bacillus subtilis var. Amyloliquefaciens Strain FZB24	NA 1220	6480	NA 170	Fungicide, Plant Growth Regulator	Microbial
Bacillus thuringiensis (berliner)	68038-71-1	6400	86	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Aizawai, GC-91 protein	68038-71-1	6426	3843	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Aizawai, serotype H-7	68038-71-1	6400	3856	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Israelensis, serotype H-14	68038-71-1	6401	3857	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Kurstaki strain SA-12	68038-71-1	6402	3970	Insecticide	Microbial
Bacillus thuringiensis	68038-71-1	6402	3858	Insecticide	Microbial

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(berliner), subsp. Kurstaki, serotype 3a,3b					
Bacillus thuringiensis (berliner), subsp. Kurstaki, strain EG2348	68038-71-1	6424	3859	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Kurstaki, strain EG2371	68038-71-1	6423	3860	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Kurstaki, strain EG2424	68038-71-1	6422	3861	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Kurstaki, strain SA-11	68038-71-1	6402	3862	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. Morrisoni, serotype 8a8b	NA 1481	6400	3863	Insecticide	Microbial
Bacillus thuringiensis (berliner), subsp. San Diego	68038-71-1	6400	3864	Insecticide	Microbial
Bacillus thuringiensis darstadiensis	68038-71-1	6404	2410	Insecticide	Microbial
Bacillus thuringiensis sub. Kurstaki strain EG7673 coleopteran active toxin	68038-71-1	6448	5051	Insecticide	Microbial
Bacillus thuringiensis sub. Kurstaki strain EG7673 lepidopteran active toxin	68038-71-1	6447	5049	Insecticide	Microbial
Bacillus thuringiensis subsp. Aizawai	NA 1224	6403	NA 170	Insecticide	Microbial
Bacillus thuringiensis subsp. Kurstaki, genetically engineered strain AGRO1 by Agrevo	68038-71-1	6402	5004	Insecticide	Microbial
Bacillus thuringiensis subsp. Kurstaki, genetically engineered strain AGRO2 by Agrevo	68038-71-1	6402	5005	Insecticide	Microbial
Bacillus thuringiensis subsp. San Diego	NA 1232	#####	NA 171	Insecticide	Microbial
Bacillus thuringiensis subsp. Tenebrionis	68038-71-1	6405	5043	Insecticide	Microbial
Bacillus thuringiensis subsp. Tenebrionis delta endotoxin	68038-71-1	NA 169	3972	Insecticide	Microbial
Bacillus thuringiensis subspecies Israelensis strain EG2215	NA 1234	6476	NA 171	Insecticide	Microbial
Bacillus thuringiensis subspecies Israelensis, strain IPS-78	68038-71-1	6401	4018	Insecticide	Microbial
Bacillus thuringiensis subspecies kurstaki strain BMP 123	68038-71-1	6407	4024	Insecticide	Microbial
Bacillus thuringiensis subspecies Kurstaki strain HD-1, lepidopteran active toxin	68038-71-1	6402	5010	Insecticide	Microbial
Bacillus thuringiensis subspecies kurstaki, genetically	68038-71-1	6453	3988	Insecticide	Microbial

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engineered strain EG7841 lepidopteran active toxin					
Bacillus thuringiensis var. kurstaki delta endotoxin protein as produced by the Cry1A(c) gene and its controlling sequences	NA 1238	6445	NA 171	Insecticide	Microbial
Bacillus thuringiensis var. Kurstaki strain M-200 protein toxin	68038-71-1	6452	3978	Insecticide	Microbial
Bacillus thuringiensis var. Kurstaki, genetically engineered strain ECX 9441	68038-71-1	6402	3962	Insecticide	Microbial
Bacillus thuringiensis var. Kurstaki, genetically engineered strain EG7826 Lepidopteran active toxin	68038-71-1	6459	5325	Insecticide	Microbial
Neodiprion sertifer nuclear polyhedrosis virus	NA 1389	NA 196	NA 195	N/A	Microbial
Nosema locustae spores	NA 20	#####	2137	Insecticide	Microbial
Nuclear polyhedrosis virus	NA 1451	NA 215	NA 214	Insecticide	Microbial
Nuclear polyhedrosis virus of Helicoverpa zea	NA 1430	NA 213	NA 213	N/A	Microbial
Nuclear polyhedrosis virus of red-headed pine sawfly	NA 1510	NA 222	NA 222	Insecticide	Microbial
Nystatin (streptomyces noursei) (withdrawn : 23614-R : pm24)	1400-61-9	#####	NA 115	N/A	Microbial
Paecilomyces fumosoroseus apopka strain 97	NA 831	#####	3964	Insecticide	Microbial
Paecilomyces Lilacinus Strain 251	NA 1439	NA 213	NA 213	Insecticide	Microbial
Penicillin G, potassium salt	NA 666	NA 123	1283	N/A	Microbial
Peniophora gigantea	NA 1462	NA 217	NA 216	Fungicide	Microbial
Phlebiopsis gigantea	NA 1388	NA 196	NA 195	Fungicide	Microbial
Phytophthora palmivora, chlamydospores of	NA 860	#####	5078	Herbicide	Microbial
Polyhedral inclusion bodies of Douglas fir tussock moth nuclear polyhedrosis virus	NA 593	#####	2009	Insecticide	Microbial
Polyhedral inclusion bodies of gypsy moth nucleopolyhedrosis virus	NA 1289	#####	NA 175	Insecticide	Microbial
Polyhedral inclusion bodies of N. sertifer	NA 1290	#####	NA 175	Insecticide	Microbial
Polyhedral occlusion bodies (OB's) of the nuclear polyhedrosis virus of Helicoverpa zea (corn earworm)	NA 835	#####	4028	Insecticide	Microbial
Polyhedral occlusion bodies (OBs) of the nuclear polyhedrosis virus of Autographa californica (alfalfa looper)	NA 1292	#####	NA 175	Insecticide	Microbial
Polyhedral occlusion bodies	NA 830	NA 153	4007	Insecticide	Microbial

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
(OBs) of the nuclear polyhedrosis virus of <i>Spodoptera exigua</i>					
Polyhedral occlusion bodies of the beet armyworm nuclear polyhedrosis virus	NA 1293	#####	NA 175	Insecticide	Microbial
<i>Pseudomonas aureofaciens</i> strain Tx-1	NA 1296	6473	NA 175	Fungicide	Microbial
<i>Pseudomonas cepacia</i> type Wisconsin	NA 449	6419	3926	Fungicide, Nematicide	Microbial
<i>Pseudomonas chlororaphis</i>	NA 902	NA 172	5182	Fungicide	Microbial
<i>Pseudomonas chlororaphis</i> strain 63-28	NA 1489	6478	NA 220	Fungicide	Microbial
<i>Pseudomonas fluorescens</i> EG-1053	NA 858	6440	5045	Fungicide	Microbial
<i>Pseudomonas fluorescens</i> 1629RS	NA 867	6439	3949	Fungicide	Microbial
<i>Pseudomonas fluorescens</i> A506	NA 1020	6438	2842	Fungicide	Microbial
<i>Pseudomonas fluorescens</i> strain NCIB 12089	NA 868	6420	3968	Fungicide	Microbial
<i>Pseudomonas syringae</i> strain AGS31 <i>Pseudomonas syringae</i> strain PS31	NA 897	NA 171	3950	N/A	Microbial
<i>Pseudomonas syringae</i> strain ESC-11	NA 836	6451	3967	Fungicide	Microbial
<i>Pseudomonas syringae</i> , strain 742 RS	68602-93-7	6411	2824	Fungicide	Microbial
<i>Pseudomonas syringae</i> , strain ESC-10	68583-32-4	6441	3960	Fungicide	Microbial
<i>Puccinia canaliculata</i> (Schweinitz) Lagerheim (ATCC #40199)	NA 865	#####	5121	Herbicide	Microbial
QST 713 strain of dried <i>Bacillus subtilis</i>	NA 915	6479	5447	Fungicide	Microbial
Rabbit Calicivirus	NA 1441	NA 214	NA 213	Rodent Repellent	Microbial
<i>Rhizobium leguminosarum</i> biovar phaseoli	NA 1556	NA 226	NA 226	Insecticide	Microbial
<i>Rhizobium leguminosarum</i> viciaeTJ 9	NA 1557	NA 226	NA 226	Insecticide	Microbial
<i>Rhizobium meliloti</i>	NA 1558	NA 227	NA 226	Insecticide	Microbial
Spinosad	131929-60-7	#####	3983	Insecticide	Microbial
Spinosyn D	131929-63-0	#####	NA 907	Insecticide	Microbial
Spores and mycelium spores of <i>Phlebiopsis gigantea</i>	NA 1446	NA 214	NA 214	Fungicide	Microbial
Spores of <i>Bacillus popilliae</i>	NA 1310	54502	NA 176	Fungicide	Microbial
Spores of <i>Gliocladium catenulatum</i>	NA 1453	NA 215	NA 215	Fungicide	Microbial
<i>Streptomyces griseoviridis</i> strain K61	NA 875	#####	3937	Fungicide	Microbial
Summerfruit tortrix moth granulosus virus	NA 1491	NA 221	NA 221	Insecticide	Microbial
Tomato mosaic virus	NA 1387	NA 196	NA 195	N/A	Microbial
<i>Trichoderma harzianum</i> (ATCC 20476)	67892-34-6	#####	NA 106	Fungicide	Microbial

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Trichoderma harzianum rifai strain KRL-AG2	67892-31-3	#####	3977	Fungicide	Microbial
Trichoderma harzianum Rifai strain T-39	67892-31-3	#####	4016	Fungicide	Microbial
Trichoderma polysporum (ATCC 20475)	67892-31-3	#####	NA 176	Fungicide	Microbial
Trichoderma polysporum rifai	NA 1067	NA 159	5101	N/A	Microbial
Verticillium dahliae Kleb.	NA 1386	NA 196	NA 195	Fungicide	Microbial
Verticillium lecanii	67892-35-7	6421	NA 96	Insecticide	Microbial
Xanthomonas campestris pv. Poannua	NA 910	NA 174	5317	Herbicide	Microbial
Yeast	NA 652	NA 119	3827	N/A	Microbial
Allyl isothiocyanate	57-06-7	4901	1010	Insecticide	Oil - essential
Almond, bitter	8013-76-1	NA 546	3576	N/A	Oil - essential
Aloe vera oil	NA 918	NA 175	5454	N/A	Oil - essential
Blend of oils: of lemongrass, of citronella, of orange, of bergamot; geraniol, ionone alpha, methyl salicylate and allylisothioc	NA 1499	NA 221	NA 221	Insecticide	Oil - essential
Camphor	76-22-2	15602	102	Insecticide, Fungicide, Microbiocide	Oil - essential
Camphor oil	8008-51-3	15601	NA 142	Insecticide, Fungicide, Microbiocide	Oil - essential
Canadian balsam	8007-47-4	67209	NA 580	Insecticide, Fungicide	Oil - essential
Cedar leaf oil	8007-20-3	40507	NA 340	Insecticide, Fungicide	Oil - essential
Cinnamon oil	NA 922	NA 175	5577	N/A	Oil - essential
Clove oil	8000-34-8	#####	5018	N/A	Oil - essential
Essential oils	8014-17-3	NA 121	873	Insecticide	Oil - essential
Eucalyptus oil	8000-48-4	40503	281	Insect Repellent, Insecticide	Oil - essential
Fir needle oil	8021-28-1	#####	NA 110	N/A	Oil - essential
Lavandin oil	8022-15-9	40500	5017	Insect Repellent, Insecticide, Dog and Cat Repellent	Oil - essential
Lemon peel oil	8020-19-7	40518	NA 346	N/A	Oil - essential
Lime Oil	8008-26-2	NA 213	NA 212	Insecticide	Oil - essential
Limonene	138-86-3	79701	979	Insect Repellent, Insecticide, Dog and Cat Repellent	Oil - essential
Limonene	138-86-3	79701	2531	Insecticide	Oil - essential
Mixture citronella oil, citrus oil, eucalyptus oil, pine oil	NA 1493	NA 221	NA 221	Insect Repellent	Oil - essential
Oil of ambergis	8038-65-1	#####	NA 105	N/A	Oil - essential
Oil of anise	8007-70-3	4301	1051	Insect Repellent, Insecticide,	Oil - essential



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				Dog and Cat Repellent	
Oil of bay	8006-78-8	40520	2072	N/A	Oil - essential
Oil of bergamot	8007-75-8	#####	1517	Insect Repellent, Insecticide, Dog and Cat Repellent	Oil - essential
Oil of black pepper	NA 1521	NA 223	NA 223	Insecticide	Oil - essential
Oil of cajeput	8008-98-8	40504	NA 339	N/A	Oil - essential
Oil of camphor sassafrassy	8006-80-2	15603	897	N/A	Oil - essential
Oil of chamomile (Matricaria chamomilla and/or Anthemidis nobilis)	8002-66-2	#####	NA 104	Insecticide	Oil - essential
Oil of chenopodium	8006-99-3	NA 18	1524	N/A	Oil - essential
Oil of citronella	8000-29-1	21901	143	Insect Repellent, Dog and Cat Repellent	Oil - essential
Oil of citrus	NA 13	NA 19	1931	Insect Repellent	Oil - essential
Oil of geranium	8000-46-2	#####	1887	Fragrance	Oil - essential
Oil of jasmine	8022-96-6	40501	5063	Insecticide	Oil - essential
Oil of jojoba	61789-91-1	67200	3833	Insecticide, Insect Repellent, Fungicide, Dog and Cat Repellent	Oil - essential
Oil of lavender	8000-28-0	#####	1888	Insecticide	Oil - essential
Oil of lemon	8008-56-8	NA 120	440	N/A	Oil - essential
Oil of lemongrass	5392-40-5	40510	1009	Insecticide, Pheromone	Oil - essential
Oil of lemongrass	2229107	40502	1136	Insect Repellent, Insecticide	Oil - essential
Oil of mustard	57-06-7	4901	1153	Insect Repellent, Insecticide, Dog and Cat Repellent	Oil - essential
Oil of orange	8008-57-9	40517	441	Insect Repellent, Insecticide, Dog and Cat Repellent	Oil - essential
Oil of pennyroyal	8007-44-1	40509	1325	Insecticide	Oil - essential
Oil of peppermint	8006-90-4	NA 669	2058	Insecticide	Oil - essential
Oil of rosemary	8000-25-7	#####	5450	Insecticide	Oil - essential
Oil of rue	8014-29-7	40519	2206	N/A	Oil - essential
Oil of spearmint	8008-79-5	#####	1508	N/A	Oil - essential
Oil of thyme	8007-46-3	#####	NA 159	N/A	Oil - essential
Oil of wintergreen	119-36-8	76601	746	Insecticide	Oil - essential
Oils, tea-tree	68647-73-4	28853	NA 211	N/A	Oil - essential
Orange pith oil	NA 1461	NA 217	NA 216	Insecticide	Oil - essential

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Perfume, cherry fragrance oil #493	NA 751	NA 136	2743	Fragrance	Oil - essential
Phytelene of marigold	70892-20-5	#####	NA 976	N/A	Oil - essential
Phytelene of marigold	84776-23-8	#####	NA 977	N/A	Oil - essential
Tansy, sage and lavender extracts	NA 1452	NA 215	NA 214	Insecticide	Oil - essential
Vanillin	121-33-5	#####	5149	N/A	Oil - essential
Canola oil	120962-03-0	11332	5332	Insecticide, Adjuvant	Oil - vegetable
Castor oil	8001-79-4	31608	1013	Rodenticide, Insecticide, Insect Repellent	Oil - vegetable
Coconut oil	8001-31-8	#####	NA 124	N/A	Oil - vegetable
Coconut oil monoethanolamine	68140-00-1	69179	1361	Adjuvant, Soap/Surfactant	Oil - vegetable
Corn oil	8001-30-7	NA 117	3626	N/A	Oil - vegetable
Cottonseed oil	8001-29-4	31602	1015	Insecticide	Oil - vegetable
Emulsifiable methylated vegetable oil	NA 907	NA 173	5224	Insecticide, Adjuvant	Oil - vegetable
Fir needle oil, siberian	8021-29-2	NA 236	2570	N/A	Oil - vegetable
Hydrogenated castor oil	8001-78-3	31604	3830	Bird Repellent	Oil - vegetable
Hydrogenated soybean oil	8016-70-4	NA 186	3670	N/A	Oil - vegetable
Hydrogenated vegetable oils	NA 881	NA 169	5146	N/A	Oil - vegetable
Linseed oil with driers	NA 61	NA 116	2645	N/A	Oil - vegetable
Linseed oil, boiled	68553-15-1	NA 115	2644	N/A	Oil - vegetable
Methyl soyate	68919-53-9	NA 146	3519	Adjuvant	Oil - vegetable
Oil of linseed	8001-26-1	31603	2248	N/A	Oil - vegetable
Olive oil	8001-25-0	31610	3710	N/A	Oil - vegetable
Palm oil	NA 749	NA 136	2731	N/A	Oil - vegetable
Peanut oil	2227315	NA 118	3722	N/A	Oil - vegetable
Plant oils (including rape seed oil)	NA 1351	NA 192	NA 191	Insecticide	Oil - vegetable
Rapeseed oil	8002-13-9	NA 220	NA 219	Insecticide	Oil - vegetable
Safflower oil	8001-23-8	NA 124	1510	N/A	Oil - vegetable
Sesame oil	8008-74-0	72401	1221	N/A	Oil - vegetable
Soybean oil	8001-22-7	31605	2335	Insecticide, Adjuvant	Oil - vegetable
Vegetable oil	8008-89-7	NA 111	1231	Insecticide	Oil - vegetable
Vegetable oil modified phenolic resin	NA 552	NA 100	2981	N/A	Oil - vegetable
Vegetable wax	8001-39-6	99501	1441	N/A	Oil - vegetable
Weed oil	NA 558	NA 101	1694	N/A	Oil - vegetable
Wheat germ oil	NA 559	NA 101	2988	N/A	Oil - vegetable
(1R-exo)-Brevicommin	20290-99-7	#####	NA 106	Pheromone	Pheromone
(4E-7Z)-4,7-Tridecadien-1-yl-acetate	NA 1428	NA 199	NA 198	Pheromone	Pheromone
(4Z-9Z)-7,9-Dodecadien-1-ol	NA 1412	NA 198	NA 197	Pheromone	Pheromone
(E)-5-decen-1-ol	56578-18-8	78038	5315	Pheromone	Pheromone
(E)-10-Dodecenyl acetate	35153-09-4	NA 187	NA 186	Pheromone	Pheromone
(E)-11-Tetradecenyl acetate	33189-72-9	#####	5022	Pheromone	Pheromone
(E)-2,6-dimethyl-2,6-octadienal	141-27-5	NA 21	3307	Pheromone	Pheromone
(E)-4-tridecen-1-yl-acetate	72269-48-8	#####	2199	Pheromone	Pheromone

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(E)-5-Decenol	56578-18-8	78038	3974	Pheromone	Pheromone
(E)-5-Decenyl acetate	38421-90-8	#####	3975	Pheromone	Pheromone
(E)-6-dodecenyl acetate	29868-16-4	#####	NA 958	Pheromone	Pheromone
(E)-9-decen-1-ol	56578-18-8	78038	5071	Pheromone	Pheromone
(E)-9-dodecen-1-ol, acetate	35148-19-7	#####	2141	Pheromone	Pheromone
(E)-9-Tricosene	35857-62-6	NA 200	NA 199	Pheromone	Pheromone
(E)7-(Z)9-Dodecadienyl acetate	NA 1413	NA 198	NA 197	Pheromone	Pheromone
(E,Z)-3,13-octadecadien-1-ol acetate	53120-26-6	#####	NA 955	Pheromone	Pheromone
(E/Z)-8-Dodecenyl acetate	NA 1415	NA 198	NA 197	Pheromone	Pheromone
(R,Z)-5-(1-decenyl) dihydro-2-(3H)-furanone	64726-91-6	#####	2096	Pheromone	Pheromone
(Z)-(3,3-dimethylcyclohexylidene)acetaldehyde	26532-24-1	#####	5081	Pheromone	Pheromone
(Z)-11-hexadecen-1-ol	56683-54-6	#####	NA 971	Pheromone	Pheromone
(Z)-11-Hexadecen-1-ol	56683-54-6	NA 193	NA 192	Pheromone	Pheromone
(Z)-11-hexadecenal	53939-28-9	#####	2126	Pheromone	Pheromone
(Z)-11-hexadecenyl acetate	60037-58-3	#####	NA 111	Pheromone	Pheromone
(Z)-11-Tetradecen-1-yl-acetate	20711-10-8	NA 199	NA 199	Pheromone	Pheromone
(Z)-11-Tetradecenyl acetate	20711-10-8	#####	5023	Pheromone	Pheromone
(Z)-13-Octadecanol	NA 1423	NA 199	NA 198	Pheromone	Pheromone
(Z)-13-Octadecenal	58594-45-9	#####	NA 111	Pheromone	Pheromone
(Z)-13-Octadecenyl acetate	34010-21-4	#####	5316	Pheromone	Pheromone
(Z)-2-(3,3-dimethyl cyclohexylidene)ethanol	26532-23-0	#####	5079	Pheromone	Pheromone
(Z)-3-Methyl-6-isopropenyl--9-decen-1-yl acetate	NA 1420	NA 198	NA 198	Pheromone	Pheromone
(Z)-3-Methyl-6-isopropenyl-3,4-decadien-1-yl	NA 1419	NA 198	NA 198	Pheromone	Pheromone
(Z)-4-tridecen-1-yl-acetate	65954-19-0	#####	2200	Pheromone	Pheromone
(Z)-5-Decenyl acetate	67446-07-5	NA 198	NA 197	Pheromone	Pheromone
(Z)-5-Dodecen-1-yl acetate	16676-96-3	NA 187	NA 186	Pheromone	Pheromone
(Z)-6-dodecenyl acetate	16974-12-2	#####	NA 957	Pheromone	Pheromone
(Z)-6-Heneicosane-11-one	54844-65-4	#####	NA 110	Pheromone	Pheromone
(Z)-7-hexadecenal	56797-40-1	#####	NA 972	Pheromone	Pheromone
(Z)-7-Tetradecanol	NA 1427	NA 199	NA 198	Pheromone	Pheromone
(Z)-7-Tetradecenal	65128-96-3	NA 187	NA 186	Pheromone	Pheromone
(Z)-9-dodecenyl acetate	16974-11-1	#####	2142	Pheromone	Pheromone
(Z)-9-hexadecenal	56219-04-6	#####	NA 973	Pheromone	Pheromone
(Z)-9-tetradecen-1-ol	35153-15-2	#####	5618	Pheromone	Pheromone
(Z)-9-tetradecenal	53939-27-8	#####	2209	Pheromone	Pheromone
(Z)-9-Tetradecenyl acetate	16725-53-4	NA 187	NA 186	Pheromone	Pheromone
(Z)-9-Tricosene	27519-02-4	#####	NA 883	Pheromone	Pheromone
(Z,E) 7,11-hexadecadien-1-ol acetate, other related	NA 1144	NA 168	91997	Pheromone	Pheromone
(Z,E)-7,11-hexadecadien-1-yl acetate	51607-94-4	#####	1997	Pheromone	Pheromone
(Z,E)-7,11-hexadecadien-1-yl acetate	53042-79-8	#####	NA 933	Pheromone	Pheromone
(Z,E)-8,10-dodecadienyl acetate	NA 1561	NA 227	NA 227	Pheromone	Pheromone
(Z,E)-9,11-Tetradecadien-1-yl	50767-79-8	NA 199	NA 198	Pheromone	Pheromone

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acetate					
(Z,E)-9,12-tetradecadienyl acetate	31654-77-0	#####	5617	Pheromone	Pheromone
(Z,Z) 7,11-hexadecadien-1-ol acetate, other related	NA 1145	NA 168	91998	Pheromone	Pheromone
(Z,Z) Octadienyl acetate	NA 1422	NA 199	NA 198	Pheromone	Pheromone
(Z,Z)-11,13-hexadecadienal	71317-73-2	711	5314	Pheromone	Pheromone
(Z,Z)-3,13-octadecadien-1-ol acetate	53120-27-7	#####	NA 954	Pheromone	Pheromone
(Z,Z)-7,11-hexadecadien-1-yl acetate	52207-99-5	#####	1998	Pheromone	Pheromone
(Z,Z)-7,11-Hexadecadienyl acetate	52207-99-5	NA 198	NA 197	Pheromone	Pheromone
1,7-Dioxaspiro-5,5-undecane	180-84-7	NA 186	NA 186	Pheromone	Pheromone
1-Methylbutyl decanoate	55195-26-1	#####	NA 100	Pheromone	Pheromone
1-Octen-3-ol	3391-86-4	69037	4029	Pheromone, Fragrance, Insect Repellent, Dog and Cat Repellent	Pheromone
11-(E)-Tetradecen-1-ol	35153-18-5	#####	5108	Pheromone	Pheromone
11-(Z)-Tetradecen-1-ol	34010-15-6	#####	NA 109	Pheromone	Pheromone
2-cyclopenten-1-one, 2-hydroxy-3-methyl-	80-71-7	4049	NA 68	Pheromone, Fragrance	Pheromone
2-methyl-7(R),8(S)-epoxy octadecane	29804-22-6	#####	2165	Pheromone	Pheromone
3(S)-Methyl-6-isopropenyl-9-dodecadien-1-yl acetate	NA 1535	NA 224	NA 224	Pheromone	Pheromone
3,7,11-trimethyl-2,6,10-dodecatriene-1-ol	4601-84-0	NA 983	2269	Pheromone	Pheromone
3-Methyl-2-cyclohexen-1-one	1193-18-6	#####	NA 124	Insect Repellent, Pheromone	Pheromone
4-(p-acetoxyphenyl)-2-butanone	609379	#####	NA 106	Pheromone	Pheromone
4-Methyl-3-heptanol	14979-39-6	#####	NA 962	Pheromone	Pheromone
7,11-hexadecadien-1-ol, acetate	50933-33-0	#####	NA 934	Pheromone	Pheromone
7,8-Epoxy-2-methyl-octadecane	NA 1417	NA 198	NA 197	Pheromone	Pheromone
8-dodecene-1-ol, other related	NA 1150	NA 168	92253	Pheromone	Pheromone
9-tetradecen-1-ol, formate, (Z)-	56218-79-2	#####	NA 967	Pheromone	Pheromone
Acetaldehyde,(3,3-dimethylcyclohexylidene)-,(E)	26532-25-2	#####	5080	Pheromone	Pheromone
beta-Farnesene	18794-84-8	#####	NA 110	Pheromone	Pheromone
Cis-11-tetradecenyl acetate	20711-10-8	#####	5038	Pheromone	Pheromone
Distilled cubeb oil	8007-87-2	#####	NA 960	Pheromone	Pheromone
Dodecadial	NA 1547	NA 226	NA 225	Pheromone	Pheromone
E,E-8,10-dodecadien-1-ol	33956-49-9	#####	1851	Pheromone	Pheromone
E-3,3-dimethyl-delta,alpha-cyclohexane ethanal	NA 951	NA 315	2193	Pheromone	Pheromone
E-8-dodecene	NA 1532	NA 224	NA 224	Pheromone	Pheromone
E-8-dodecenyl acetate	38363-29-0	#####	2252	Pheromone	Pheromone
Farnesol	4602-84-0	#####	2564	Pheromone	Pheromone
Frontalin	28401-39-0	#####	NA 985	Pheromone	Pheromone
Frontalin + alpha-pinene	12701-72-3	#####	NA 986	Pheromone	Pheromone

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
mixture					
German cockroach pheromone	NA 871	29028	5132	Pheromone	Pheromone
Isoamyl acetate	123-92-2	NA 167	1422	Fragrance	Pheromone
Isomate LBAM	NA 1438	NA 213	NA 212	Pheromone	Pheromone
Isomate OFM Rosso	NA 1426	NA 213	NA 212	Pheromone	Pheromone
Lauryl alcohol	112-53-8	1509	2343	Pheromone, Adjuvant	Pheromone, Alcohol/Ether
Luretape (Grandlure)	11104-05-5	#####	NA 923	Pheromone	Pheromone
Methyl-trans-6-nonenolate	NA 1421	NA 199	NA 198	Pheromone	Pheromone
Multilure	60018-97-5	#####	NA 963	Pheromone	Pheromone
Multistriatin	59014-03-8	#####	NA 961	Pheromone	Pheromone
Muscalure	27519-02-4	#####	1858	Pheromone	Pheromone
Myrcene	123-35-3	#####	2189	Pheromone	Pheromone
Nerolidol	7212-44-4	#####	2268	Pheromone	Pheromone
Nerolidol	7212-44-4	#####	2701	Pheromone	Pheromone
Pentyl valerate	2173-56-0	#####	1809	Pheromone	Pheromone
Periplanone B	61228-92-0	#####	2766	Pheromone	Pheromone
Pherodim	NA 1424	NA 199	NA 198	Pheromone	Pheromone
Pronumone	NA 1425	NA 199	NA 198	Pheromone	Pheromone
Serricornin	NA 1343	NA 191	NA 190	Pheromone	Pheromone
Tetradecanal	124-25-4	#####	NA 975	Pheromone	Pheromone
Trans-11-tetradecenyl acetate	33189-72-9	#####	5039	Pheromone	Pheromone
trans-6-Nonen-1-ol	NA 1404	NA 197	NA 197	Pheromone	Pheromone
Trimedlure	12002-53-8	#####	NA 199	Pheromone	Pheromone
Z-2-isopropenyl-1-methyl cyclobutane ethanol	26532-22-9	#####	2190	Pheromone	Pheromone
Z-3,3-dimethyl-delta,alpha-cyclohexane ethanal	NA 952	NA 316	2192	Pheromone	Pheromone
Z-3,3-dimethyl-delta,beta-cyclohexane ethanol	NA 706	NA 129	2191	Pheromone	Pheromone
Z-8-dodecene	NA 1531	NA 224	NA 224	Pheromone	Pheromone
Z-8-dodecenol	40642-40-8	#####	2253	Pheromone	Pheromone
Z-8-dodecenyl acetate	28079-04-1	#####	2251	Pheromone	Pheromone
7-(diethyl amino)-4-methyl coumarin	91-44-1	NA 341	3146	Rodenticide	Coumarin
Brodifacoum	56073-10-0	#####	2049	Rodenticide	Coumarin
Bromadiolone	28772-56-7	#####	2135	Rodenticide	Coumarin
Coumachlor	81-82-3	#####	NA 126	Rodenticide	Coumarin
Coumafuryl	117-52-2	86001	298	Rodenticide	Coumarin
Coumafuryl, sodium salt	34490-93-2	86004	299	Rodenticide	Coumarin
Coumarin	91-64-5	#####	NA 102	Rodenticide	Coumarin
Coumatetralyl	5836-29-3	#####	NA 153	Rodenticide	Coumarin
Difenacoum	56073-07-5	#####	NA 970	Rodenticide	Coumarin
Flocoumafen	90035-08-8	NA 182	NA 181	Rodenticide	Coumarin
Potassium warfarin	2610-86-8	86005	NA 836	Rodenticide	Coumarin
Pyranocoumarin	NA 1431	NA 199	NA 199	Rodenticide	Coumarin
Warfarin	81-81-2	86002	621	Rodenticide	Coumarin
Warfarin, sodium salt	129-06-6	86003	1184	Rodenticide	Coumarin
2-isovaleryl 1-1,3-indandione	83-28-3	67702	1435	Rodenticide	1,3-Indandione
2-isovaleryl 1-1,3-indandione, calcium salt	23710-76-1	67706	1736	Rodenticide	1,3-Indandione
2-isovaleryl-1,3-indandione, sodium salt	53404-57-2	67709	NA 596	Rodenticide	1,3-Indandione
Chlorophacinone	3691-35-8	67707	1625	Rodenticide	1,3-Indandione

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Diphacinone	82-66-6	67701	225	Rodenticide	1,3-Indandione
Diphacinone, sodium salt	42721-99-3	67705	1636	Rodenticide	1,3-Indandione
Pindone	83-26-1	67703	489	Rodenticide	1,3-Indandione
Pindone, calcium salt	53404-72-1	67708	NA 595	Rodenticide	1,3-Indandione
Pindone, sodium salt	6120-20-3	67704	1305	Rodenticide, Bird Repellent	1,3-Indandione
4-Hydroxymethyl pendimethalin	NA 1173	NA 177	NA 165	Breakdown product	2,6-Dinitroaniline
Benfluralin	1861-40-1	84301	53	Herbicide	2,6-Dinitroaniline
Butralin	33629-47-9	#####	1756	Herbicide	2,6-Dinitroaniline
Dinitramine	29091-05-2	#####	1683	Herbicide	2,6-Dinitroaniline
Dipropalin	5332	#####	NA 145	Herbicide	2,6-Dinitroaniline
Ethalfuralin	55283-68-6	#####	2166	Herbicide	2,6-Dinitroaniline
Fluazinam	79622-59-6	#####	3898	Fungicide	2,6-Dinitroaniline
Fluchloralin	33245-39-5	#####	1848	Herbicide	2,6-Dinitroaniline
Flumetralin	62924-70-3	#####	5085	Plant Growth Regulator	2,6-Dinitroaniline
Isopropalin	33820-53-0	#####	1681	Herbicide	2,6-Dinitroaniline
N,N-Bis(2-chloroethyl)-4- methyl-2,6-dinitroaniline	26389-78-6	#####	NA 135	N/A	2,6-Dinitroaniline
Nitralin	4726-14-1	37601	490	Herbicide	2,6-Dinitroaniline
Oryzalin	19044-88-3	#####	1868	Herbicide	2,6-Dinitroaniline
Pendimethalin	40487-42-1	#####	1929	Herbicide	2,6-Dinitroaniline
Prodiamine	29091-21-2	#####	2236	Herbicide	2,6-Dinitroaniline
Prodiamine, other related	NA 1149	NA 168	92236	Herbicide	2,6-Dinitroaniline
Profluralin	26399-36-0	#####	1897	Herbicide	2,6-Dinitroaniline
Profluralin, other related	NA 1141	NA 167	91897	Herbicide	2,6-Dinitroaniline
Trifluralin	1582-09-8	36101	597	Herbicide	2,6-Dinitroaniline
1-(3- chlorophthalimido)cyclohexane carboxamide	51971-67-6	#####	NA 110	N/A	Carboxamide
Allidochlor	93-71-0	19301	114	Herbicide	Amide
Allidochlor	202-270-7	NA 210	NA 210	Herbicide	Amide
Ammonium benzadox	5251-79-6	98201	NA 858	Herbicide	Amide
Beflubutamid	113614-08-7	NA 230	NA 230	Herbicide	Amide
Benzadox	5251-93-4	#####	NA 132	Herbicide	Amide
Benzipram	35256-86-1	#####	NA 133	Herbicide	Amide
Bromobutide	74712-19-9	NA 203	NA 203	Herbicide	Amide
Carboxin	5234-68-4	90201	1755	Fungicide	Carboxamide
Chlorthiamid	1918-13-4	#####	NA 139	Herbicide	Amide
Cisanilide	34484-77-0	#####	NA 144	Herbicide	Carboxamide
Cyclafuramide	34849-42-8	#####	NA 132	Fungicide	Carboxamide
Cyprazole	42089-03-2	#####	NA 132	Herbicide	Amide
Dimethenamid	87674-68-8	#####	5112	Herbicide	Amide
Diphenamid	957-51-7	36601	226	Herbicide	Amide
Epronaz	59026-08-3	NA 231	NA 231	Herbicide	Amide
Etnipromid	76120-02-0	NA 231	NA 231	Herbicide	Amide
Fenfuram	24691-80-3	NA 188	NA 187	Fungicide	Carboxamide
Fentrazamide	158237-07-1	NA 232	NA 231	Herbicide	Amide
Flupoxam	119126-15-7	NA 188	NA 188	Herbicide	Amide
Furmecyclox (Xyligen B)	60568-05-0	#####	NA 18	Fungicide	Carboxamide
Halosafen	77227-69-1	NA 229	NA 229	Herbicide	Amide, Nitrophenyl ether
Isocarbamide	30979-48-7	NA 183	NA 182	Herbicide	Amide

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Isoxaben	82558-50-7	#####	2289	Herbicide	Amide
Methfuroxam	28730-17-8	#####	NA 949	Fungicide	Carboxamide
Metsulfovax	21452-18-6	NA 189	NA 188	Fungicide	Carboxamide
Napropamide	15299-99-7	#####	1728	Herbicide	Amide
Naptalam	132-66-1	30702	2998	Herbicide	Amide
Naptalam, sodium salt	132-67-2	30703	437	Herbicide	Amide
Nitrofurazone (not subject to FIFRA : 8709-e pm 24)	59-87-0	#####	NA 128	N/A	Carboxamide
Oxycarboxin	5259-88-1	90202	1434	Fungicide	Carboxamide
p-Benzoquinone semicarbazone	61566-21-0	#####	NA 133	N/A	Carboxamide
Pethoxamid	106700-29-2	NA 233	NA 233	Herbicide	Amide
Propyzamide	23950-58-5	#####	694	Herbicide	Amide
Propyzamide metabolite	NA 1048	NA 155	4093	Breakdown product	Amide
Quinonamid	27541-88-4	NA 210	NA 209	Herbicide	Amide
2-Hydroxy alachlor	NA 943	NA 183	2602	Breakdown product	Chloroacetanilide
3,4,5-tribromo salicylanilide, other related	NA 1122	NA 165	90833	Microbiocide	Anilide
3,5-dibromosalicylanilide	2577-72-2	77405	1256	Microbiocide	Anilide
5,4-dibromosalicylanilide	NA 1024	NA 122	1071	Microbiocide	Anilide
Aatram (propachlor with atrazine) (019101+080803)	8070-76-6	80816	NA 781	Herbicide	Triazine, Chloroacetanilide
Acetochlor	34256-82-1	#####	2349	Herbicide	Chloroacetanilide
Alachlor	15972-60-8	90501	678	Herbicide	Chloroacetanilide
Benodanil	15310-01-7	#####	NA 154	Fungicide	Anilide
Butachlor	23184-66-9	#####	4056	Herbicide	Chloroacetanilide
Butenachlor	87310-56-3	NA 206	NA 206	Herbicide	Chloroacetanilide
Clomeprop	84496-56-0	NA 204	NA 203	Herbicide	Anilide
Cyprofuram	69581-33-5	NA 186	NA 185	Fungicide	Anilide
Cypromid	2759-71-9	26101	178	Herbicide	Anilide
Delachlor	24353-58-0	#####	NA 132	Herbicide	Chloroacetanilide
Diethatyl-ethyl	38727-55-8	#####	1995	Herbicide	Chloroacetanilide
Diflufenican	83164-33-4	NA 184	NA 183	Herbicide	Anilide
Dimethachlor	50563-36-5	NA 184	NA 183	Herbicide	Chloroacetanilide
Etobenzanid	79540-50-4	NA 229	NA 228	Herbicide	Anilide
Fenasulam	78357-48-9	NA 231	NA 231	Herbicide	Anilide
Flufenacet	142459-58-3	#####	5293	Herbicide	Anilide
Flufenican	NA 1568	NA 234	NA 234	Herbicide	Anilide
Flutolanil	66332-96-5	#####	2305	Fungicide	Anilide
Mefenacet	73250-68-7	NA 189	NA 188	Herbicide	Anilide
Mefluidide	53780-34-0	#####	5082	Herbicide, Plant Growth Regulator	Anilide
Mefluidide, diethanolamine salt	53780-36-2	#####	1955	Herbicide	Anilide
Mefluidide, potassium salt	83601-83-6	#####	5083	Herbicide	Anilide
Meprotil	55814-41-0	NA 189	NA 188	Fungicide	Anilide
Metazachlor	67129-08-2	NA 184	NA 183	Herbicide	Chloroacetanilide
Metolachlor	51218-45-2	#####	1996	Herbicide	Chloroacetanilide
Metolachlor, (S)	87392-12-9	#####	5133	Herbicide	Chloroacetanilide
Monalide	7287-36-7	#####	NA 134	Herbicide	Anilide
Naproanilide	52570-16-8	NA 233	NA 232	Herbicide	Anilide
Ofurace	58810-48-3	NA 189	NA 188	Fungicide	Anilide

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Oxadixyl	77732-09-3	#####	3539	Fungicide	Anilide
Perfluidone	37924-13-3	#####	1895	Herbicide	Anilide
Perfluidone, diethanolamine salt	NA 991	NA 671	1896	Herbicide	Anilide
Pretilachlor	51218-49-6	NA 184	NA 184	Herbicide	Chloroacetanilide
Propachlor	1918-16-7	19101	511	Herbicide	Chloroacetanilide
Propanil	709-98-8	28201	503	Herbicide	Anilide
Propisochlor	86763-47-5	NA 233	NA 233	Herbicide	Chloroacetanilide
Prynachlor	21267-72-1	#####	NA 138	Herbicide, Plant Growth Regulator	Chloroacetanilide
Pyracarbolid	24691-76-7	NA 210	NA 209	Fungicide	Anilide
Salicylanilide	87-17-2	77407	450	Fungicide, Microbiocide	Anilide
Sodium salicylanilide	251930	#####	NA 145	Fungicide	Anilide
Thenylchlor	96491-05-3	NA 229	NA 229	Herbicide	Chloroacetanilide
Triclocarban	101-20-2	27901	844	N/A	Anilide
Benzoylprop	22212-56-2	NA 182	NA 181	Herbicide	Arylalanine
Benzoylprop ethyl	22212-55-1	#####	NA 147	Herbicide	Arylalanine
Benzoylprop-ethyl	33878-50-1	NA 206	NA 205	Herbicide	Arylalanine
Flamprop	58667-63-3	NA 188	NA 187	Herbicide	Arylalanine
Flamprop-isopropyl	52756-22-6	#####	NA 154	Herbicide	Arylalanine
Flamprop-M-isopropyl	57973-67-8	#####	NA 154	Herbicide	Arylalanine
Flamprop-M-methyl	57973-66-7	#####	NA 104	Herbicide	Arylalanine
Flamprop-methyl	52756-25-9	#####	NA 154	Herbicide	Arylalanine
Chlorazifop	60074-25-1	NA 231	NA 230	Herbicide	Aryloxyphenoxy propionic acid
Clodinafop	114420-56-3	NA 182	NA 182	Plant Growth Regulator	Aryloxyphenoxy propionic acid
Clodinafop-propargyl	105512-06-9	#####	NA 163	Plant Growth Regulator	Aryloxyphenoxy propionic acid
Clofop	26129-32-8	NA 207	NA 206	Herbicide	Aryloxyphenoxy propionic acid
Cyhalofop	122008-78-0	NA 204	NA 203	Herbicide	Aryloxyphenoxy propionic acid
Cyhalofop butyl	122008-85-9	NA 215	5748	Herbicide	Aryloxyphenoxy propionic acid
Diclofop	40843-25-2	#####	NA 912	Herbicide	Aryloxyphenoxy propionic acid
Diclofop-methyl	51338-27-3	#####	2034	Herbicide	Aryloxyphenoxy propionic acid
Fenoxaprop-ethyl (stereochemistry unspecified)	82110-72-3	NA 201	NA 200	Herbicide	Aryloxyphenoxy propionic acid
Fenoxaprop-P (+)	71283-80-2	#####	5123	Herbicide	Aryloxyphenoxy propionic acid
Fenoxaprop-P (+/-)	66441-23-4	#####	2311	Herbicide	Aryloxyphenoxy propionic acid
Fenoxaprop-P-ethyl	113158-40-0	NA 220	NA 219	Herbicide	Aryloxyphenoxy propionic acid
Fenthiaprop (racemic)	95721-12-3	NA 207	NA 207	Herbicide	Aryloxyphenoxy propionic acid
Fenthiaprop (unstated stereochemistry)	73519-50-3	NA 218	NA 217	Herbicide	Aryloxyphenoxy propionic acid
Fenthiaprop-ethyl (racemic)	93921-16-5	NA 218	NA 217	Herbicide	Aryloxyphenoxy propionic acid



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Fenthiaprop-ethyl (unstated stereochemistry)	66441-11-0	NA 218	NA 217	Herbicide	Aryloxyphenoxy propionic acid
Fluazifop	69335-91-7	NA 194	NA 193	Herbicide	Aryloxyphenoxy propionic acid
Fluazifop-butyl	69806-50-4	#####	2186	Herbicide	Aryloxyphenoxy propionic acid
Fluazifop-P-butyl	79241-46-6	#####	NA 995	Herbicide	Aryloxyphenoxy propionic acid
Fluazifop-P-butyl	83066-88-0	NA 228	NA 228	Herbicide	Aryloxyphenoxy propionic acid
Haloxifop (unstated stereochemistry)	69806-34-4	#####	NA 100	Herbicide	Aryloxyphenoxy propionic acid
Haloxifop-etotyl (unstated stereochemistry)	87237-48-7	NA 200	NA 199	Herbicide	Aryloxyphenoxy propionic acid, Glycol Ether
Haloxifop-methyl (unstated stereochemistry)	690806-40-2	#####	NA 19	Herbicide	Aryloxyphenoxy propionic acid
Haloxifop-R	72619-32-0	NA 191	NA 190	Herbicide	Aryloxyphenoxy propionic acid
Propaquizafop	111479-05-1	NA 185	NA 184	Herbicide	Aryloxyphenoxy propionic acid
Quizalofop	76578-12-6	NA 190	NA 189	Herbicide	Aryloxyphenoxy propionic acid
Quizalofop-ethyl	76578-14-8	#####	2226	Herbicide	Aryloxyphenoxy propionic acid
Quizalofop-P	94051-08-8	NA 185	NA 184	Herbicide	Aryloxyphenoxy propionic acid
Quizalofop-P-ethyl	100646-51-3	NA 212	NA 211	Herbicide	Aryloxyphenoxy propionic acid
Quizalofop-p-tefuryl	119738-06-6	NA 202	NA 202	Herbicide	Aryloxyphenoxy propionic acid
Trifop	58594-74-4	NA 234	NA 233	Herbicide	Aryloxyphenoxy propionic acid
2,5-Dichlorobenzoic acid	50-79-3	NA 224	NA 224	Fungicide	Benzoic acid
2,5-Dichlorobenzoic acid methyl ester	2905-69-3	NA 224	NA 224	Fungicide	Benzoic acid
3,5-dichlorobenzoic acid	51-36-5	NA 156	4066	N/A	Benzoic acid
4'-hydroxy-m-phenoxy benzoic acid	35065-12-4	NA 176	2609	Fungicide, Microbiocide	Benzoic acid
4-hydroxy benzoic acid	99-96-7	NA 200	NA 199	N/A	Benzoic acid
5-hydroxy-dicamba	NA 840	NA 156	4065	Herbicide, Breakdown product	Benzoic acid
Butyl paraben	94-26-8	61205	NA 496	Fungicide, Microbiocide	Benzoic acid
Chloramben	133-90-4	29901	2184	Herbicide	Benzoic acid
Chloramben, ammonium salt	1076-46-6	29902	831	Herbicide	Benzoic acid
Chloramben, ammonium salt, other related	NA 1121	NA 165	90831	Herbicide	Benzoic acid
Dicamba	1918-00-9	29801	200	Herbicide	Benzoic acid
Dicamba with 2,4-D	8068-77-7	29807	NA 219	Herbicide	Benzoic acid
Dicamba with 2,4-D & Silvex	8073-53-8	29808	NA 220	Herbicide	Benzoic acid
Dicamba, aluminium salt	NA 1215	#####	NA 170	Herbicide	Benzoic acid
Dicamba, butoxyethyl ester	NA 1477	NA 220	NA 219	Herbicide	Benzoic acid
Dicamba, diethanolamine salt	25059-78-3	29803	780	Herbicide	Benzoic acid
Dicamba, diglycolamine salt	104040-79-1	#####	5007	Herbicide	Benzoic acid

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Dicamba, dimethylamine salt	2300-66-5	29802	849	Herbicide	Benzoic acid
Dicamba, dimethylamine salt, other related	NA 1123	NA 165	90849	Herbicide	Benzoic acid
Dicamba, isopropylamine salt	55871-02-8	#####	5098	Herbicide	Benzoic acid
Dicamba, methyl ester	6597-78-0	#####	NA 146	Herbicide	Benzoic acid
Dicamba, monoethanolamine salt	53404-28-7	29804	1829	Herbicide	Benzoic acid
Dicamba, monoethanolamine salt, other related	NA 1140	NA 167	91829	Herbicide	Benzoic acid
Dicamba, other related	NA 1084	NA 161	90200	Herbicide	Benzoic acid
Dicamba, potassium salt	10007-85-9	#####	5110	Herbicide	Benzoic acid
Dicamba, sodium salt	1982-69-0	29806	5057	Herbicide	Benzoic acid
Dicamba, triethanolamine salt	53404-29-8	29805	1113	Herbicide	Benzoic acid
Dichlorobenzoic acid methylester	NA 1383	NA 195	NA 194	Fungicide	Benzoic acid
Diethanolamine 3-amino-2,5-dichlorobenzoate	53404-16-3	29904	NA 222	Herbicide	Benzoic acid
Dodecylamine salicylate	7491-21-6	39302	2003	Insecticide, Fungicide, Microbiocide	Benzoic acid
Ethyl paraben	120-47-8	61202	3204	Fungicide, Microbiocide	Benzoic acid
Homosalate	118-56-9	76603	3231	Insecticide, Fungicide, Microbiocide	Benzoic acid
Methyl chloramben	7286-84-2	29905	NA 223	Herbicide	Benzoic acid
Methyl paraben	99-76-3	61201	1005	Fungicide, Microbiocide	Benzoic acid
Methyl paraben, calcium salt	40167-95-1	61208	NA 499	Fungicide, Microbiocide	Benzoic acid
Methyl paraben, sodium salt	5026-62-0	61207	NA 498	Fungicide, Microbiocide	Benzoic acid
Monomethylammonium chloramben ( 3-amino-2,5-dichlorobenzoic acid )	25182-03-0	29903	NA 221	Herbicide	Benzoic acid
Propyl paraben	94-13-3	61203	2841	Fungicide, Microbiocide	Benzoic acid
Propyl paraben, calcium salt	83542-69-2	61206	NA 497	Fungicide, Microbiocide	Benzoic acid
Propyl paraben, sodium salt	35285-69-9	61204	NA 495	Fungicide, Microbiocide	Benzoic acid
Salicylic acid	69-72-7	76602	1170	Insecticide, Fungicide, Microbiocide	Benzoic acid
Sodium 3-amino-2,5-dichlorobenzoate	1954-81-0	29906	NA 224	Herbicide	Benzoic acid
Tricamba	2307-49-5	17301	NA 151	Herbicide	Benzoic acid
Anisuron	2689-43-2	#####	NA 138	Herbicide	Benzoylurea
Diflubenzuron	35367-38-5	#####	1992	Insecticide	Benzoylurea
Flucycloxiuron	113036-88-7	#####	NA 109	Herbicide	Benzoylurea
Flucycloxiuron, (E)	94050-52-9	NA 201	NA 200	Herbicide	Benzoylurea
Flufenoxuron	101463-69-8	#####	NA 901	Insecticide	Benzoylurea
Hexaflumuron	86479-06-3	#####	3899	Insecticide	Benzoylurea
Lufenuron	103055-07-8	NA 184	NA 183	Insecticide	Benzoylurea
Novaluron	116714-46-6	NA 226	NA 226	Herbicide	Benzoylurea

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Phenobenzuron	449583	#####	NA 133	Herbicide	Benzoylurea
Teflubenzuron	83121-18-0	#####	NA 33	Insecticide	Benzoylurea
Triflumuron	64628-44-0	#####	2961	Insecticide	Benzoylurea
Diethamquat chloride	NA 1567	NA 231	NA 231	Herbicide	Bipyridylum
Diquat bistribromide	27041-82-3	#####	NA 146	Herbicide	Bipyridylum
Diquat dibromide	85-00-7	32201	229	Herbicide, Dessicant	Bipyridylum
Diquat ion	2764-72-9	32202	NA 294	N/A	Bipyridylum
Monolinuron with paraquat dichloride	69312-67-0	#####	NA 119	Herbicide	Urea, Bipyridylum
Morfamquat	7411-47-4	#####	NA 135	N/A	Bipyridylum
Morfamquat	7411-47-4	NA 201	NA 200	Herbicide	Bipyridylum
Morfamquat chloride	4636-83-3	NA 212	NA 212	Herbicide	Bipyridylum
Paraquat	4685-14-7	61603	NA 500	Herbicide	Bipyridylum
Paraquat bis(methylsulfate)	2074-50-2	61602	458	Herbicide	Bipyridylum
Paraquat bistribromide	27041-84-5	#####	NA 159	Herbicide	Bipyridylum
Paraquat dichloride	1910-42-5	61601	1601	Herbicide	Bipyridylum
Priglone (diquat dibromide w/paraquat ion)	78403-23-3	32203	NA 295	N/A	Bipyridylum
1,3-Dimethyl-1,1,3,3-disiloxanetetrol-1,3-bis(dimethylthiocarbamate)	22232-20-8	34601	NA 303	N/A	Bis-Carbamate
Desmedipham	13684-56-5	#####	1748	Herbicide	Bis-Carbamate
Dimethyl (4-methyl-1,3-phenylenebis(iminocarbonyl-1H-benzimidazole-1,2-diyl))biscarbamate	51543-98-7	#####	NA 888	Fungicide	Bis-Carbamate
Phenisopham	57375-63-0	NA 209	NA 208	Herbicide	Bis-Carbamate
Phenmedipham	13684-63-4	98701	675	Herbicide	Bis-Carbamate
Phenmedipham-ethyl	13684-44-1	#####	NA 149	Herbicide	Bis-Carbamate
2-Hydroxy alachlor	NA 943	NA 183	2602	Breakdown product	Chloroacetanilide
Aatram (propachlor with atrazine) (019101+080803)	8070-76-6	80816	NA 781	Herbicide	Triazine, Chloroacetanilide
Acetochlor	34256-82-1	#####	2349	Herbicide	Chloroacetanilide
Alachlor	15972-60-8	90501	678	Herbicide	Chloroacetanilide
Butachlor	23184-66-9	#####	4056	Herbicide	Chloroacetanilide
Butenachlor	87310-56-3	NA 206	NA 206	Herbicide	Chloroacetanilide
Delachlor	24353-58-0	#####	NA 132	Herbicide	Chloroacetanilide
Diethatyl-ethyl	38727-55-8	#####	1995	Herbicide	Chloroacetanilide
Dimethachlor	50563-36-5	NA 184	NA 183	Herbicide	Chloroacetanilide
Metazachlor	67129-08-2	NA 184	NA 183	Herbicide	Chloroacetanilide
Metolachlor	51218-45-2	#####	1996	Herbicide	Chloroacetanilide
Metolachlor, (S)	87392-12-9	#####	5133	Herbicide	Chloroacetanilide
Pretilachlor	51218-49-6	NA 184	NA 184	Herbicide	Chloroacetanilide
Propachlor	1918-16-7	19101	511	Herbicide	Chloroacetanilide
Propisochlor	86763-47-5	NA 233	NA 233	Herbicide	Chloroacetanilide
Prynachlor	21267-72-1	#####	NA 138	Herbicide, Plant Growth Regulator	Chloroacetanilide
Thenylchlor	96491-05-3	NA 229	NA 229	Herbicide	Chloroacetanilide
(2-Methyl-4,6-dichlorophenoxy)acetic acid (as impurity)	13333-87-4	#####	NA 161	Impurity	Chlorophenoxy acid or ester

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2,3,6-Trichlorophenylacetic acid	2903-64-2	82603	NA 819	Herbicide	Chlorophenoxy acid or ester
2,3,6-Trichlorophenylacetic acid, sodium salt	53404-91-4	82604	NA 820	Herbicide	Chlorophenoxy acid or ester
2,4,5-T	93-76-5	82001	639	Herbicide	Chlorophenoxy acid or ester
2,4,5-T tetradecylamine salt	53535-37-8	82013	1989	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, 2-ethylhexyl ester	1928-47-8	82063	1092	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, alkylamine salt	53535-37-8	82013	818	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, butoxyethanol ester	2545-59-7	82053	819	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
2,4,5-T, butoxyethanol ester	2545-59-7	82072	NA 166	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, butoxypropyl ester	1928-48-9	82055	820	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, butyl ester	93-79-8	82056	822	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, butyric acid	93-80-1	#####	NA 152	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, dimethylamine salt	6369-97-7	82019	1474	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, dodecylamine salt	53404-84-5	82011	1988	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, isooctyl ester	25168-15-4	NA 121	851	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, N-oleyl-1,3-propylenediamine salt	53404-87-8	82029	1097	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, propylene glycol butyl ether ester	1928-48-9	82055	824	Herbicide	Chlorophenoxy acid or ester
2,4,5-T, triethylamine salt	2008-46-0	82034	850	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, 2-ethyl-4-methylpentyl ester	69462-12-0	82064	NA 799	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, alkyl(C13) amine salt	53404-85-6	82012	NA 790	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, amyl ester	120-39-8	82051	NA 795	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, butoxyethoxypropanol ester	1928-58-1	82052	NA 796	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, diethylethanolamine salt	53404-86-7	82038	NA 793	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, isobutyl ester	4938-72-1	82062	NA 798	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, isopropyl ester	93-78-7	82066	NA 800	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, N,N-dimethyl oleyl-linoleyl amine salt	55256-33-2	82039	NA 794	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, N,N-dimethyl linoleylamine salt	53404-88-9	82037	NA 792	Herbicide	Chlorophenoxy acid or ester

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2,4,5-trichlorophenoxyacetic acid, N,N-dimethylethylamine salt	53404-89-0	82020	NA 791	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, pentyl ester	55491-33-3	82077	NA 803	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, sodium salt	13560-99-1	82004	NA 789	Herbicide	Chlorophenoxy acid or ester
2,4,5-trichlorophenoxyacetic acid, tripropylene glycol isobutyl ether ester	53535-32-3	82075	NA 802	Herbicide	Chlorophenoxy acid or ester
2,4-D	94-75-7	30001	636	Herbicide, Plant Growth Regulator	Chlorophenoxy acid or ester
2,4-D with 2,4,5-T	8015-35-8	30077	NA 259	Herbicide	Chlorophenoxy acid or ester
2,4-D, 2-ethyl-4-methylpentyl ester	53404-37-8	NA 227	NA 227	Herbicide	Chlorophenoxy acid or ester
2,4-D, 2-ethylhexyl ester	1928-43-4	30063	1622	Herbicide	Chlorophenoxy acid or ester
2,4-D, alkanolamine salts (ethanol and isopropanol amines)	2307-55-3	30005	801	Herbicide	Chlorophenoxy acid or ester
2,4-D, alkyl (C12) amine salts	2212-54-6	30011	980	Herbicide	Chlorophenoxy acid or ester
2,4-D, alkyl (C14) amine salts	28685-18-9	30013	981	Herbicide	Chlorophenoxy acid or ester
2,4-D, butoxy ethoxy propanol ester	1928-57-0	30052	1255	Herbicide	Chlorophenoxy acid or ester
2,4-D, butoxyethanol ester	1929-73-3	30053	802	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
2,4-D, butoxyethanol ester	1929-73-3	30061	NA 166	Herbicide	Chlorophenoxy acid or ester
2,4-D, butoxypropyl ester	1928-45-6	30055	803	Herbicide	Chlorophenoxy acid or ester
2,4-D, butyl ester	94-80-4	30056	804	Herbicide	Chlorophenoxy acid or ester
2,4-D, chlorocrotyl ester	2971-38-2	NA 228	NA 227	Herbicide	Chlorophenoxy acid or ester
2,4-D, diethanolamine salt	5742-19-8	30016	805	Herbicide	Chlorophenoxy acid or ester
2,4-D, diethylamine salt	20940-37-8	30017	875	Herbicide	Chlorophenoxy acid or ester
2,4-D, dimethylamine salt	2008-39-1	30019	806	Herbicide	Chlorophenoxy acid or ester
2,4-D, dodecylamine salt	2212-54-6	30011	807	Herbicide	Chlorophenoxy acid or ester
2,4-D, heptylamine salt	37102-63-9	30023	1962	Herbicide	Chlorophenoxy acid or ester
2,4-D, isooctyl ester	25168-26-7	30064	809	Herbicide	Chlorophenoxy acid or ester
Triclopyr	55335-06-3	#####	NA 36	Herbicide	Chloropyridinyl
Triclopyr ethyl ester	60825-27-6	#####	NA 108	Herbicide	Chloropyridinyl
Triclopyr, butoxyethyl ester	64700-56-7	#####	2170	Herbicide	Chloropyridinyl, Glycol Ether
Triclopyr, triethylamine salt	57213-69-1	#####	2131	Herbicide	Chloropyridinyl
Alloxydim	55634-91-8	NA 203	NA 203	Herbicide	Cyclohexenone

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					derivative
Alloxydim sodium	55635-13-7	#####	NA 926	Herbicide	Cyclohexenone derivative
Butoxydim	138164-12-2	NA 202	NA 202	Herbicide	Cyclohexenone derivative
Clethodim	99129-21-2	#####	3566	Herbicide	Cyclohexenone derivative
Cloproxydim	95480-33-4	NA 231	NA 231	Herbicide	Cyclohexenone derivative
Cycloxydim	101205-02-1	NA 184	NA 183	Herbicide	Cyclohexenone derivative
Sethoxydim	74051-80-2	#####	2177	Herbicide	Cyclohexenone derivative
Tepaloxym	149979-41-9	#####	NA 982	Herbicide	Cyclohexenone derivative
Tralkoxydim	87820-88-0	#####	5457	Herbicide	Cyclohexenone derivative
2,4-dinitrophenol	51-28-5	37509	221	Impurity	Dinitrophenol derivative
2,4-dinitrophenol, sodium salt (as impurity)	1011-73-0	#####	NA 161	Impurity, Breakdown product	Dinitrophenol derivative
2,4-Dinitrophenyl thiocyanate	1594-56-5	#####	NA 146	N/A	Dinitrophenol derivative
2,6-dinitrophenol, sodium salt (as impurity)	32581-06-9	#####	NA 161	Impurity	Dinitrophenol derivative
2-Cyclohexyl-4,6-dinitrophenol dicyclohexylamine	317-83-9	37502	NA 316	N/A	Dinitrophenol derivative
3,3'-Dichloro-5,5'-dinitro-(1,1'-biphenyl)-2,2'-diol	15595-24-1	#####	NA 137	N/A	Dinitrophenol derivative
3,3'-Dichloro-5,5'-dinitro-(1,1'-biphenyl)-2,2'-diol	63992-31-4	#####	NA 137	N/A	Dinitrophenol derivative
4,6-Dinitro-2-cyclohexylphenol, 2-((2-aminoethyl)amino)ethanol salt	69632-97-9	#####	NA 145	N/A	Dinitrophenol derivative
4,6-Dinitro-2-cyclohexylphenol, triethanolamine salt	69632-98-0	#####	NA 145	N/A	Dinitrophenol derivative
5,5'-Dichloro-3,3'-dinitro-(1,1'-biphenyl)-2,2'-diol	10331-57-4	#####	NA 137	N/A	Dinitrophenol derivative
6,6'-Dichloro-4,4'-dinitro-(1,1'-biphenyl)-2,2'-diol	21832-25-7	#####	NA 137	N/A	Dinitrophenol derivative
Binapacryl	485-31-4	12201	73	Herbicide	Dinitrophenol derivative
Diethanolamine dinoseb ( 2-sec-butyl-4,6-dinitrophenol )	53404-43-6	37514	NA 320	Herbicide	Dinitrophenol derivative
Dinex	131-89-5	37501	NA 315	N/A	Dinitrophenol derivative
Dinitro cresol	534-52-1	37507	3170	Fungicide	Dinitrophenol derivative
Dinitro-1-methyl heptyl phenol	NA 159	NA 302	758	N/A	Dinitrophenol derivative
Dinitrophenol (mixed isomers)	25550-58-7	NA 223	NA 223	Breakdown product, Impurity	Dinitrophenol derivative
Dinobuton	973-21-7	#####	2526	Insecticide,	Dinitrophenol

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				Fungicide	derivative
Dinocap	39300-45-3	36001	344	Fungicide, Insecticide	Dinitrophenol derivative
Dinocap, other related	NA 1091	NA 162	90344	Insecticide, Fungicide	Dinitrophenol derivative
Dinocton	32534-96-6	NA 207	NA 206	Insecticide, Fungicide	Dinitrophenol derivative
Dinofenate	61614-62-8	#####	NA 146	Herbicide	Dinitrophenol derivative
Dinopenton	5386-57-2	#####	NA 154	N/A	Dinitrophenol derivative
Dinoprop	7257-41-2	#####	NA 138	N/A	Dinitrophenol derivative
Dinosam	4097-36-3	37504	NA 318	N/A	Dinitrophenol derivative
Dinoseb	88-85-7	37505	238	Herbicide, Defoliant	Dinitrophenol derivative
Dinoseb acetate	2813-95-8	NA 207	NA 206	Herbicide	Dinitrophenol derivative
Dinoseb, amine salt	2244387	37511	239	Herbicide, Defoliant	Dinitrophenol derivative
Dinoseb, ammonium salt	6365-83-9	37513	240	Herbicide, Defoliant	Dinitrophenol derivative
Dinoseb, sodium salt	35040-03-0	37512	1445	Herbicide, Defoliant	Dinitrophenol derivative
Dinoseb, triethanolamine salt	6420-47-9	37506	235	Herbicide, Defoliant	Dinitrophenol derivative
Dinosulfon	5386-77-6	#####	NA 157	N/A	Dinitrophenol derivative
Dinoterb	1420-07-1	#####	NA 128	Herbicide	Dinitrophenol derivative
Dinoterbon	6073-72-9	#####	NA 128	Herbicide	Dinitrophenol derivative
DNOC, sodium salt	2312-76-7	37508	533	Fungicide, Microbiocide, Insecticide, Herbicide	Dinitrophenol derivative
Etinofen	2544-94-7	#####	NA 147	N/A	Dinitrophenol derivative
Medinoterb acetate	212943	NA 208	NA 208	Herbicide	Dinitrophenol derivative
Methyl 2-(1-methylheptyl)-4,6-dinitrophenyl carbonate	5386-68-5	#####	NA 157	N/A	Dinitrophenol derivative
Premerge plus (naptalam with dinoseb)	8075-57-8	30704	NA 278	Herbicide	Dinitrophenol derivative
Sodium naptalam with sodium dinoseb	59915-53-6	30705	NA 279	Herbicide	Dinitrophenol derivative
Sultropen	963-22-4	#####	NA 146	N/A	Dinitrophenol derivative
Acifluorfen	50594-66-6	#####	NA 935	Herbicide	Diphenyl ether
Acifluorfen, sodium salt	62476-59-9	#####	2218	Herbicide	Diphenyl ether
Aclonifen	74070-46-5	NA 187	NA 187	Herbicide	Diphenyl ether
Bifenox	42576-02-3	#####	1953	Herbicide	Diphenyl ether
Chlomethoxyfen	32861-85-1	NA 185	NA 185	Herbicide	Diphenyl ether
Diofenolan	63837-33-2	7703	NA 101	Herbicide	Diphenyl ether
Ethyl acifluorfen	77207-01-3	#####	NA 936	Herbicide	Diphenyl ether

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Fluoroglycofen	77501-60-1	NA 181	NA 180	Herbicide	Diphenyl ether
Fomesafen	72178-02-0	#####	NA 17	Herbicide	Diphenyl ether
Fomesafen sodium	108731-70-0	#####	5086	Herbicide	Diphenyl ether
Lactofen	77501-63-4	#####	3538	Herbicide	Diphenyl ether
Methyl acifluorfen	50594-67-7	#####	NA 937	Herbicide	Diphenyl ether
Oxyfluorfen	42874-03-3	#####	1973	Herbicide	Diphenyl ether
Bromobonil	25671-46-9	#####	NA 134	Herbicide	Hydroxybenzonitrile
Bromoxynil butyrate	3861-41-4	35303	2163	Herbicide	Hydroxybenzonitrile
Bromoxynil heptanoate	56634-95-8	#####	5036	Herbicide	Hydroxybenzonitrile
Bromoxynil octanoate	1689-99-2	35302	834	Herbicide	Hydroxybenzonitrile
Bromoxynil pentanoate	NA 1476	NA 220	NA 219	Herbicide	Hydroxybenzonitrile
Bromoxynil phenol	1689-84-5	35301	2429	Herbicide	Hydroxybenzonitrile
Chloroxynil	1891-95-8	#####	NA 138	Herbicide	Hydroxybenzonitrile
Ioxynil	1689-83-4	#####	2616	Herbicide	Hydroxybenzonitrile
Ioxynil lithium	2961-61-7	#####	NA 141	Herbicide	Hydroxybenzonitrile
Ioxynil octanoate	3861-47-0	#####	NA 141	Herbicide	Hydroxybenzonitrile
Ioxynil sodium	2961-62-8	#####	NA 141	Herbicide	Hydroxybenzonitrile
3-5-(1,1-Dimethylethyl)-3-isoxazolyl-4-hydroxy-1-methyl-2-imidazolidinone	78327-32-9	#####	NA 108	Algaecide	Imidazolinone
3-Pyridinecarboxylic acid, 2-(4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl)-5-methyl-, (.+.)-	81334-60-3	#####	NA 1	Herbicide	Imidazolinone
Imazamethabenz	81405-85-8	#####	2240	Herbicide	Imidazolinone
Imazamox	114311-32-9	#####	NA 2	Herbicide	Imidazolinone
Imazapic	104098-48-8	NA 212	NA 211	Herbicide	Imidazolinone
Imazapyr	81334-34-1	#####	2256	Herbicide	Imidazolinone
Imazapyr, isopropylamine salt	81510-83-0	#####	2257	Herbicide	Imidazolinone
Imazaquin	81335-37-7	#####	2613	Herbicide, Plant Growth Regulator	Imidazolinone
Imazaquin, ammonium salt	81335-47-9	#####	3006	Herbicide	Imidazolinone
Imazaquin, sodium salt	81335-46-8	#####	5109	Herbicide	Imidazolinone
Imazethapyr	81335-77-5	#####	2340	Herbicide, Plant Growth Regulator	Imidazolinone
Imazethapyr, ammonium salt	101917-66-2	#####	2341	Herbicide	Imidazolinone
Pyridine carboxylic acid, 2-(4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl)-5-methyl, monoammonium salt	104098-49-9	#####	5097	Herbicide	Imidazolinone
Chloreturon	20782-58-5	NA 231	NA 230	Herbicide	Phenylurea
Daimuron	42609-52-9	NA 204	NA 204	Herbicide	Phenylurea
Fluothiuuron	33439-45-1	NA 232	NA 232	Herbicide	Phenylurea
Methyldymron	42609-73-4	NA 205	NA 204	Herbicide	Phenylurea
Tetrafluoron	27954-37-6	#####	NA 145	Herbicide	Phenylurea
Bilanafos	71048-99-2	NA 202	NA 201	Herbicide	Phosphinico amino acid
Ampropylofos	16606-64-7	NA 181	NA 180	Fungicide	Phosphonic acid
Glyphosate	1071-83-6	#####	2997	Herbicide	Phosphonoglycine
Glyphosate, ammonium salt	114370-14-8	NA 228	2319	Herbicide	Phosphonoglycine



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Glyphosate, diammonium salt	NA 1566	NA 229	5810	Herbicide	Phosphonoglycine
Glyphosate, isopropylamine salt	38641-94-0	#####	1855	Herbicide	Phosphonoglycine
Glyphosate, monoammonium salt	114370-14-8	#####	2301	Herbicide	Phosphonoglycine
Glyphosate, sodium sesqui salt	70393-85-0	#####	2275	Herbicide	Phosphonoglycine
Glyphosate-trimesium	81591-81-3	#####	2327	Herbicide	Phosphonoglycine
N,N-Bis(phosphonomethyl)glycine	2439-99-8	#####	NA 884	Herbicide	Phosphonoglycine
6-chloropicolinic acid	4684-94-0	69206	NA 657	Herbicide	Pyridinecarboxylic acid
Clopyralid	1702-17-6	#####	5135	Herbicide	Pyridinecarboxylic acid
Clopyralid copper	NA 1458	NA 216	NA 216	Herbicide	Pyridinecarboxylic acid
Clopyralid, monoethanolamine salt	57754-85-5	#####	5050	Herbicide	Pyridinecarboxylic acid
Clopyralid, triethylamine salt	NA 955	#####	2339	Herbicide	Pyridinecarboxylic acid
Picloram	5145	5101	593	Herbicide	Pyridinecarboxylic acid
Picloram, alkanolamine salt	NA 1479	NA 220	NA 219	Herbicide	Pyridinecarboxylic acid
Picloram, diethanolamine salt	5145	NA 220	NA 220	Herbicide	Pyridinecarboxylic acid
Picloram, isooctyl ester	26952-20-5	5103	835	Herbicide	Pyridinecarboxylic acid
Picloram, potassium salt	2545-60-0	5104	5330	Herbicide	Pyridinecarboxylic acid
Picloram, triethylamine salt	35832-11-2	5105	NA 77	Herbicide	Pyridinecarboxylic acid
Picloram, triisopropanolamine salt	6753-47-5	5102	1099	Herbicide	Pyridinecarboxylic acid
Picolinafen	137641-05-5	NA 210	NA 210	Herbicide	Pyridinecarboxylic acid
Thiazopyr	117718-60-2	#####	3984	Herbicide	Pyridinecarboxylic acid
Amidosulfuron	120923-37-7	NA 183	NA 183	Herbicide	Sulfonylurea
Azimsulfuron	120162-55-2	#####	NA 112	Herbicide	Sulfonylurea
Bensulfuron	99283-01-9	NA 181	NA 180	Herbicide	Sulfonylurea
Bensulfuron methyl	83055-99-6	#####	2263	Herbicide	Sulfonylurea
Chlorimuron	99283-00-8	NA 204	NA 203	Herbicide	Sulfonylurea
Chlorimuron ethyl	90982-32-4	#####	2458	Herbicide	Sulfonylurea
Chlorsulfuron	64902-72-3	#####	2143	Herbicide	Sulfonylurea
Cinosulfuron	94593-91-6	NA 183	NA 183	Herbicide	Sulfonylurea
Cyclosulfamuron	136849-15-5	NA 204	NA 203	Herbicide	Sulfonylurea
Ethametsulfuron	111353-84-5	NA 212	NA 212	Herbicide	Sulfonylurea
Ethametsulfuron-methyl	97780-06-8	#####	NA 43	Herbicide	Sulfonylurea
Ethoxysulfuron	126801-58-9	NA 226	NA 225	Herbicide	Sulfonylurea
Flazasulfuron	104040-78-0	NA 229	NA 228	Herbicide	Sulfonylurea
Flupyrasulfuron	150315-10-9	NA 205	NA 204	Herbicide	Sulfonylurea
Flupyrasulfuron-methyl	NA 1460	NA 216	NA 216	Herbicide	Sulfonylurea
Flupyrasulfuron-methyl, sodium salt	144740-54-5	NA 218	NA 217	Herbicide	Sulfonylurea
Halosulfuron	100784-20-1	#####	3919	Herbicide	Sulfonylurea

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Imazosulfuron	122548-33-8	NA 229	NA 229	Herbicide	Sulfonylurea
Iodosulfuron methyl	185119-76-0	NA 212	NA 211	Herbicide	Sulfonylurea
Iodosulfuron methyl, sodium salt	144550-36-7	NA 212	NA 211	Herbicide	Sulfonylurea
Mesosulfuron-methyl	208465-21-8	#####	NA 993	Herbicide	Sulfonylurea
Metsulfuron	5585-64-8	NA 183	NA 182	Herbicide	Sulfonylurea
Metsulfuron-methyl	74223-64-6	#####	2222	Herbicide	Sulfonylurea
Nicosulfuron	111991-09-4	#####	3829	Herbicide	Sulfonylurea
Oxasulfuron	144651-06-9	#####	NA 991	Herbicide	Sulfonylurea
Primisulfuron-methyl	86209-51-0	#####	5103	Herbicide	Sulfonylurea
Prosulfuron	94125-34-5	#####	5115	Herbicide	Sulfonylurea
Pyrasulfuron	98389-04-9	NA 205	NA 205	Herbicide	Sulfonylurea
Pyrasulfuron-ethyl	93697-74-6	NA 218	NA 217	Herbicide	Sulfonylurea
Rimsulfuron	122931-48-0	#####	3835	Herbicide	Sulfonylurea
Sulfometuron	74223-56-6	NA 206	NA 205	Herbicide	Sulfonylurea
Sulfometuron methyl	74222-97-2	#####	2149	Herbicide	Sulfonylurea
Sulfosulfuron	141776-32-1	85601	5136	Herbicide	Sulfonylurea
Thifensulfuron	79277-67-1	NA 183	NA 182	Herbicide	Sulfonylurea
Thifensulfuron-methyl	79277-27-3	#####	2237	Herbicide	Sulfonylurea
Triasulfuron	82097-50-5	#####	5100	Herbicide	Sulfonylurea
Tribenuron	106040-48-6	NA 206	NA 205	Herbicide	Sulfonylurea
Tribenuron methyl	101200-48-0	#####	2338	Herbicide	Sulfonylurea
Triflusulfuron-methyl	126535-15-7	#####	3875	Herbicide	Sulfonylurea
Tritosulfuron	142469-14-5	NA 234	NA 234	Herbicide	Sulfonylurea
Butylate	2008-41-5	41405	565	Herbicide	Thiocarbamate
Calcium thylenebis (dithiocarbamate)	5895-18-1	14501	NA 139	Microbiocide	Dithiocarbamate
Cufraneb	11096-18-7	NA 181	NA 180	Fungicide	Dithiocarbamate
Cycloate	1134-23-2	41301	516	Herbicide	Thiocarbamate
Diammonium ethylenebis(dithiocarbamate)	607313	14502	NA 140	Microbiocide	Dithiocarbamate
Dimepiperate	61432-55-1	NA 186	NA 185	Herbicide	Thiocarbamate
EPTC	759-94-4	41401	264	Herbicide	Thiocarbamate
Esprocarb	85785-20-2	NA 203	NA 202	Herbicide	Thiocarbamate
Ethiolate	2941-55-1	#####	1793	Herbicide	Thiocarbamate
Fenothiocarb	62850-32-2	NA 188	NA 187	Insecticide	Thiocarbamate
Ferbam	14484-64-1	34801	288	Fungicide	Dithiocarbamate
Ferric nitroso dimethyl dithiocarbamate	83542-83-0	#####	NA 149	Microbiocide	Dithiocarbamate
Furathiocarb	65907-30-4	NA 176	NA 52	Insecticide	Thiocarbamate
Isopolinate	3134-70-1	NA 232	NA 232	Herbicide	Thiocarbamate
Mancopper	53988-93-5	NA 181	NA 180	Fungicide	Dithiocarbamate
Mancozeb	2233100	14504	211	Fungicide	Dithiocarbamate, Inorganic-Zinc
Maneb	12427-38-2	14505	369	Fungicide	Dithiocarbamate
Maneb and nickel sulfate hexahydrate (014505 + 050505)	8005-46-7	#####	NA 158	Fungicide	Dithiocarbamate, Inorganic-Nickel
Manganous dimethyldithiocarbamate	15339-36-3	34802	NA 304	Fungicide	Dithiocarbamate
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Metam sodium, dihydrate	137-42-8	39003	NA 163	Fumigant,	Dithiocarbamate

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				Fungicide, Microbiocide, Algaecide, Nematicide	
Metam-sodium	6734-80-1	39003	616	Fumigant, Herbicide, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Methasulfocarb	66952-49-6	NA 202	NA 201	Fungicide, Plant Growth Regulator	Thiocarbamate
Methiobencarb	18357-78-3	NA 232	NA 232	Herbicide	Thiocarbamate
Metiram	9006-42-2	14601	493	Fungicide	Dithiocarbamate, Inorganic-Zinc
Molinate	2212-67-1	41402	449	Herbicide	Thiocarbamate
Molinate sulfoxide	NA 1052	NA 156	4080	Breakdown product	Thiocarbamate
Morpholinomethyl dimethyldithiocarbamate	31848-11-0	#####	NA 158	Microbiocide	Dithiocarbamate
Nabam	142-59-6	14503	417	Fungicide, Herbicide	Dithiocarbamate
Orbencarb	34622-58-7	NA 189	NA 188	Herbicide	Thiocarbamate
Pebulate	1114-71-2	41403	590	Herbicide	Thiocarbamate
Phenylmercuric dimethyldithiocarbamate	32407-99-1	66008	NA 555	Microbiocide, Fungicide	Organomercury, Dithiocarbamate, Heavy metal
Potassium ammonium ethylenebis(dithiocarbamate)	22221-14-3	14507	NA 141	Microbiocide	Dithiocarbamate
Potassium dimethyl dithio carbamate	128-03-0	34803	1934	Microbiocide	Dithiocarbamate
Potassium N-hydroxymethyl- N-methyldithio carbamate	51026-28-9	#####	1824	N/A	Dithiocarbamate
Potassium N-methyldithio carbamate	137-41-7	39002	970	Fumigant, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Propineb	12071-83-9	#####	NA 155	Fungicide, Microbiocide	Dithiocarbamate, Inorganic-Zinc
Prosulfocarb	52888-80-9	NA 185	NA 184	Herbicide	Thiocarbamate
Prothiocarb	19622-08-3	NA 183	NA 182	Fungicide	Thiocarbamate
Prothiocarb hydrochloride	19622-19-6	NA 200	NA 199	Fungicide	Thiocarbamate
Pyributicarb	88678-67-5	NA 229	NA 229	Herbicide	Thiocarbamate
S-tert-Butyl dipropylthiocarbamate	2212-63-7	#####	NA 128	Herbicide	Thiocarbamate
Sodium dimethyl dithio carbamate	128-04-1	34804	548	Fungicide	Dithiocarbamate
Sulfallate	95-06-7	39001	115	Herbicide	Dithiocarbamate
Tert-butyl dimethyl trithio peroxycarbamate	3304-97-0	34807	1383	Rodent Repellent	Dithiocarbamate
Tert- butyldimethyltrithioperoxycarb amate, other related	NA 1130	NA 166	91383	N/A	Dithiocarbamate
Thiobencarb	28249-77-6	#####	1933	Herbicide	Thiocarbamate

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Thiobencarb sulfoxide	NA 1042	NA 139	2937	Breakdown product	Thiocarbamate
Thiodicarb	59669-26-0	#####	2202	Molluscicide, Insecticide	Thiocarbamate
Thiram	137-26-8	79801	589	Fungicide	Dithiocarbamate
Thiram and NAD and IBA and 2-methyl-1-naphthaleneacetamide and 2-methyl-1-naphthaleneacetic acid	75497-92-6	56011	NA 463	Fungicide, Plant Growth Regulator	Dithiocarbamate
Tiocarbazil	36756-79-3	#####	NA 911	Herbicide	Thiocarbamate
Triallate	2303-17-5	78802	49	Herbicide	Thiocarbamate
Tricopper dichloride dimethyldithiocarbamate	7076-63-3	#####	NA 152	Microbiocide	Dithiocarbamate, Inorganic-Copper
Vernolate	1929-77-7	41404	1987	Herbicide	Thiocarbamate
Zineb	12122-67-7	14506	627	Fungicide	Dithiocarbamate, Inorganic-Zinc
Zineb-ethylene thiuram disulfide adduct	NA 1465	NA 217	NA 216	Fungicide	Dithiocarbamate, Inorganic-Zinc
Ziram	137-30-4	34805	629	Fungicide, Microbiocide, Dog and Cat Repellent	Dithiocarbamate, Inorganic-Zinc
Ziram, cyclohexylamine complex	16509-79-8	34806	1328	Dog and Cat Repellent, Fungicide	Dithiocarbamate, Inorganic-Zinc
1,3,5-Triethylhexahydro-s-triazine	7779-27-3	82901	NA 823	Fungicide	Triazine
2-(Diethylamino)-4-(isopropylamino)-6-methoxy-s-triazine	3004-70-4	80812	NA 780	N/A	Triazine
2-chloro-4-((hydroxymethyl)amino)-6-(isopropylamino)-s-triazine	29450-57-5	#####	NA 135	N/A	Triazine
3-(chloromethyl)-4-ketobenz-1,2,3-triazine (as impurity)	24310-41-6	#####	NA 162	Impurity	Triazine
3-(Hydroxymethyl)-4-ketobenz-1,2,3-triazine (as impurity)	24310-40-5	#####	NA 162	Impurity	Triazine
Aatram (propachlor with atrazine) (019101+080803)	8070-76-6	80816	NA 781	Herbicide	Triazine, Chloroacetanilide
Ametryne	834-12-8	80801	18	Herbicide	Triazine
Ametryne, other related	NA 1071	NA 160	90018	Herbicide	Triazine
Anilazine	101-05-3	80811	256	Fungicide	Triazine
Atraton	1610-17-9	80802	4050	Herbicide	Triazine
Atrazine	1912-24-9	80803	45	Herbicide	Triazine
Atrazine dealkylated	NA 1059	NA 157	4052	Breakdown product	Triazine
Atrazine, other related	NA 1072	NA 160	90045	Herbicide	Triazine
Aziprotryne	4658-28-0	#####	NA 130	Herbicide	Triazine
Chlorazine	580-48-3	80806	NA 777	N/A	Triazine
Cyanatryn	21689-84-9	NA 230	NA 229	Herbicide	Triazine
Cyanazine	21725-46-2	#####	1640	Herbicide	Triazine
Cyanazine acid	NA 1328	NA 178	NA 178	Breakdown product	Triazine
Cyanazine amide	NA 1170	NA 176	NA 164	Breakdown	Triazine

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				product	
Cyanazine, other related	NA 1133	NA 166	91640	Herbicide	Triazine
Cyanuric acid	108-80-5	81402	2138	Microbiocide, Water Treatment	Triazine
Cyanuric acid, monosodium salt	2624-17-1	NA 122	1031	Microbiocide, Water Treatment	Triazine
Cybutryne	28159-98-0	#####	4033	Microbiocide	Triazine
Cyprazine	22936-86-3	#####	1701	Herbicide	Triazine
Cyromazine	66215-27-8	#####	2286	Insecticide	Triazine
Deethyl ametryne	NA 1168	NA 176	NA 164	Breakdown product	Triazine
Deethyl hydroxyatrazine	NA 1330	NA 179	NA 178	Breakdown product	Triazine
Deethyl-atrazine	NA 1058	NA 157	4051	Breakdown product	Triazine
Deethyl-simazine	NA 1047	NA 154	4096	Breakdown product	Triazine
Deethylhydroxysimazine	NA 1064	NA 159	5031	Breakdown product	Triazine
Deisopropyl atrazine	NA 1169	NA 176	NA 164	Breakdown product	Triazine
Deisopropyl hydroxyatrazine	NA 1331	NA 179	NA 178	Breakdown product	Triazine
Deisopropyl prometryn	NA 1334	NA 179	NA 179	Breakdown product	Triazine
Desamino-metribuzin	NA 1473	NA 219	NA 219	Breakdown product	Triazine
Desmetryne	1014-69-3	80810	NA 779	Herbicide	Triazine
Diaminochlorotriazine	NA 856	NA 159	5028	Breakdown product	Triazine
Diaminohydroxytriazine	NA 857	NA 159	5032	Breakdown product	Triazine
Dichloro-s-triazinetriene	2782-57-2	81401	204	Microbiocide, Water Treatment	Triazine
Dichloroisocyanuric acid, potassium salt	2244-21-5	81403	2	Microbiocide, Water Treatment	Triazine
Didealkyl atrazine	NA 1329	NA 178	NA 178	Breakdown product	Triazine
Didealkyl hydroxyatrazine	NA 1332	NA 179	NA 178	Breakdown product	Triazine
Diketo-desamino-metribuzin	NA 1475	NA 219	NA 219	Breakdown product	Triazine
Diketo-metribuzin	NA 1474	NA 219	NA 219	Breakdown product	Triazine
Dimethametryn	22936-75-0	80815	2287	Herbicide	Triazine
Dipropetryn	4147-51-7	#####	2532	Herbicide	Triazine
Eglinazine	6616-80-4	NA 207	NA 207	Herbicide	Triazine
Eglinazine-ethyl	6616-80-4	NA 218	NA 217	Herbicide	Triazine
Ethiozin (ebuzin/tycor)	64529-56-2	#####	NA 15	N/A	Triazine
Hexahydro-1,3,5-triethyl-S-triazine	108-74-7	NA 125	1670	Herbicide	Triazine
Hexahydro-1,3,5-tris (2-	1028251	83301	1171	Microbiocide	Triazine

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
hydroxyethyl)-s-triazine					
Hexahydro-1,3,5-tris(2-hydroxypropyl)-s-triazine	25254-50-6	#####	1915	N/A	Triazine
Hexahydro-1,3,5-tris(3-methoxypropyl)-1,3,5-triazine	751061	#####	NA 127	N/A	Triazine
Hexazinone	51235-04-2	#####	1871	Herbicide	Triazine
Hydroxyatrazine	2163-68-0	NA 178	NA 178	Breakdown product	Triazine
Ipazin	1912-25-0	#####	NA 130	N/A	Triazine
Isomethiozin	57052-04-7	#####	NA 875	N/A	Triazine
Metamitron	41394-05-2	NA 135	2672	Herbicide	Triazine
Methometon	1771-07-9	#####	NA 156	N/A	Triazine
Methoprotrotyne	841-06-5	#####	NA 154	Herbicide	Triazine
Metribuzin	21087-64-9	#####	1692	Herbicide	Triazine
Metribuzin-DA	NA 1053	NA 156	4079	Breakdown product	Triazine
Mono (trichloro) tetra (monopotassium dichloro) penta-s-triazine	30622-37-8	81406	856	Microbiocide, Water Treatment	Triazine
MPMT	845-52-3	82701	2695	N/A	Triazine
Potassium 1,3-dichloro-2,4,6-trioxo hexahydro-s-triazine	NA 173	NA 346	1650	N/A	Triazine
Prefix (cyprazine with ethiolate)	8071-40-7	#####	NA 886	Herbicide	Triazine
Procyanazine	32889-48-8	#####	NA 908	Herbicide	Triazine
Proglinazine	68228-20-6	NA 209	NA 209	Herbicide	Triazine
Proglinazine-ethyl	68228-18-2	NA 218	NA 218	Herbicide	Triazine
Prometon	1610-18-0	80804	499	Herbicide	Triazine
Prometryn	7287-19-6	80805	502	Herbicide	Triazine
Propazine	139-40-2	80808	504	Herbicide	Triazine
Pymetrozine	123312-89-0	#####	5232	Insecticide	Triazine
Sebuthylazine	7286-69-3	#####	NA 127	N/A	Triazine
Secbumeton	26259-45-0	#####	2849	Herbicide	Triazine
Simazine	122-34-9	80807	531	Herbicide	Triazine
Simetone	673-04-1	#####	3532	Herbicide	Triazine
Simetryn	1014-70-6	#####	4097	N/A	Triazine
Sodium dichloro-s-triazinetriene	2893-78-9	81404	205	Microbiocide, Water Treatment	Triazine
Sodium dichloro-s-triazinetriene dihydrate	51580-86-0	81407	1818	Microbiocide, Water Treatment	Triazine
Sym-triazine	108-80-5	81402	893	Microbiocide, Water Treatment	Triazine
Terbumeton	33693-04-8	NA 190	NA 189	Herbicide	Triazine
Terbuthylazine	5915-41-3	80814	3004	Algaecide, Herbicide, Microbiocide	Triazine
Terbutryn	886-50-0	80813	1691	Herbicide	Triazine
Terbutryn, other related	NA 1136	NA 167	91691	Herbicide	Triazine
Triaziflam	131475-57-5	NA 234	NA 233	Herbicide	Triazine
Trichloro melamine	2107336	77101	1023	Microbiocide	Triazine
Trichloro-s-triazinetriene	87-90-1	81405	407	Microbiocide, Water	Triazine

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Treatment	
Trietazine	1912-26-1	80809	NA 778	Herbicide	Triazine
1,3-Diphenyl urea	102-07-8	NA 186	NA 185	Plant Growth Regulator	Urea
3,4-Dichloromethylphenyl urea	NA 1335	NA 179	NA 179	Breakdown product	Urea
3,4-Dichlorophenyl urea	154536	NA 179	NA 179	Breakdown product	Urea
3-(Trifluoromethyl)phenyl urea	13114-87-9	NA 179	NA 178	Breakdown product	Urea
Amidosulfuron	120923-37-7	NA 183	NA 183	Herbicide	Sulfonylurea
Anisuron	2689-43-2	#####	NA 138	Herbicide	Benzoylurea
Azimsulfuron	120162-55-2	#####	NA 112	Herbicide	Sulfonylurea
Bensulfuron	99283-01-9	NA 181	NA 180	Herbicide	Sulfonylurea
Bensulfuron methyl	83055-99-6	#####	2263	Herbicide	Sulfonylurea
Bentaluron	NA 1405	NA 197	NA 197	Fungicide	Urea
Benzthiazuron	1929-88-0	#####	NA 133	Herbicide	Urea
Buthiuron	30043-55-1	NA 230	NA 230	Herbicide	Urea
Buturon	3766-60-7	#####	NA 119	Herbicide	Urea
Chlorbromuron	13360-45-7	90701	1733	Herbicide	Urea
Chloreturon	20782-58-5	NA 231	NA 230	Herbicide	Phenylurea
Chlorimuron	99283-00-8	NA 204	NA 203	Herbicide	Sulfonylurea
Chlorimuron ethyl	90982-32-4	#####	2458	Herbicide	Sulfonylurea
Chlorotoluron	15545-48-9	#####	NA 122	Herbicide	Urea
Chloroxuron	1982-47-4	25501	576	Herbicide	Urea
Chlorsulfuron	64902-72-3	#####	2143	Herbicide	Sulfonylurea
Cinosulfuron	94593-91-6	NA 183	NA 183	Herbicide	Sulfonylurea
Cumyluron	99485-76-4	NA 228	NA 228	Herbicide	Urea
Cyclosulfamuron	136849-15-5	NA 204	NA 203	Herbicide	Sulfonylurea
Cycluron	2163-69-1	35504	NA 306	Herbicide	Urea
Daimuron	42609-52-9	NA 204	NA 204	Herbicide	Phenylurea
Demethylfluometuron	NA 1333	NA 179	NA 178	Breakdown product	Urea
Dichloral urea	116-52-9	#####	NA 115	Herbicide	Urea
Difenoxuron	14214-32-5	#####	NA 156	Herbicide	Urea
Diflubenzuron	35367-38-5	#####	1992	Insecticide	Benzoylurea
Dimefuron	34205-21-5	NA 186	NA 185	Herbicide	Urea
Diuron	330-54-1	35505	231	Herbicide	Urea
Ethametsulfuron	111353-84-5	NA 212	NA 212	Herbicide	Sulfonylurea
Ethametsulfuron-methyl	97780-06-8	#####	NA 43	Herbicide	Sulfonylurea
Ethidimuron	30043-49-3	#####	NA 994	Herbicide	Urea
Ethoxysulfuron	126801-58-9	NA 226	NA 225	Herbicide	Sulfonylurea
Fenuron	101-42-8	35507	4072	Herbicide	Urea
Fenuron trichloroacetate	4482-55-7	35508	5035	Herbicide	Urea
Flazasulfuron	104040-78-0	NA 229	NA 228	Herbicide	Sulfonylurea
Flucyclohexuron	113036-88-7	#####	NA 109	Herbicide	Benzoylurea
Flucyclohexuron, (E)	94050-52-9	NA 201	NA 200	Herbicide	Benzoylurea
Flufenoxuron	101463-69-8	#####	NA 901	Insecticide	Benzoylurea
Fluometuron	2164-17-2	35503	166	Herbicide	Urea
Fluothiuuron	33439-45-1	NA 232	NA 232	Herbicide	Phenylurea
Flupyralsulfuron	150315-10-9	NA 205	NA 204	Herbicide	Sulfonylurea
Flupyralsulfuron-methyl	NA 1460	NA 216	NA 216	Herbicide	Sulfonylurea
Flupyralsulfuron-methyl, sodium salt	144740-54-5	NA 218	NA 217	Herbicide	Sulfonylurea

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Forchlorfenuron	68157-60-8	#####	5557	Plant Growth Regulator	Urea
Halosulfuron	100784-20-1	#####	3919	Herbicide	Sulfonylurea
Hexaflumuron	86479-06-3	#####	3899	Insecticide	Benzoylurea
Imazosulfuron	122548-33-8	NA 229	NA 229	Herbicide	Sulfonylurea
Iodosulfuron methyl	185119-76-0	NA 212	NA 211	Herbicide	Sulfonylurea
Iodosulfuron methyl, sodium salt	144550-36-7	NA 212	NA 211	Herbicide	Sulfonylurea
Isononuron	28805-78-9	#####	NA 151	Herbicide	Urea
Isoproturon	34123-59-6	#####	NA 155	Herbicide	Urea
Isouron	55861-78-4	#####	NA 101	Herbicide	Urea
Linuron	330-55-2	35506	361	Herbicide	Urea
Lufenuron	103055-07-8	NA 184	NA 183	Insecticide	Benzoylurea
Mesosulfuron-methyl	208465-21-8	#####	NA 993	Herbicide	Sulfonylurea
Methabenzthiazuron	18691-97-9	#####	NA 133	Herbicide	Urea
Methiuron	21540-35-2	#####	NA 145	Herbicide	Urea
Methyldymron	42609-73-4	NA 205	NA 204	Herbicide	Phenylurea
Metobenzuron	111578-32-6	#####	NA 37	Herbicide	Urea
Metobromuron	3060-89-7	35901	NA 313	Herbicide	Urea
Metoxuron	19937-59-8	#####	NA 135	Herbicide	Urea
Metsulfuron	5585-64-8	NA 183	NA 182	Herbicide	Sulfonylurea
Metsulfuron-methyl	74223-64-6	#####	2222	Herbicide	Sulfonylurea
Monisouron	55807-46-0	NA 233	NA 232	Herbicide	Urea
Monolinuron	1746-81-2	#####	NA 119	Herbicide	Urea
Monolinuron with paraquat dichloride	69312-67-0	#####	NA 119	Herbicide	Urea, Bipyridylum
Monuron	150-68-5	35501	408	Herbicide	Urea
Monuron-TCA	140-41-0	35502	409	Herbicide	Urea
Neburon	555-37-3	12001	424	Herbicide	Urea
Nicosulfuron	111991-09-4	#####	3829	Herbicide	Sulfonylurea
Norea	18530-56-8	35801	435	Herbicide	Urea
Norea (stereochemistry unspecified)	2163-79-3	NA 201	NA 200	Herbicide	Urea
Norea, other related	NA 1096	NA 163	90435	Herbicide	Urea
Novaluron	116714-46-6	NA 226	NA 226	Herbicide	Benzoylurea
Oxasulfuron	144651-06-9	#####	NA 991	Herbicide	Sulfonylurea
Parafluron	7159-99-1	35510	NA 307	Herbicide	Urea
Pencycuron	66063-05-6	#####	NA 103	Fungicide	Urea
Penfluron	35367-31-8	#####	NA 100	Herbicide	Urea
Phenobenzuron	449583	#####	NA 133	Herbicide	Benzoylurea
Primisulfuron-methyl	86209-51-0	#####	5103	Herbicide	Sulfonylurea
Prosulfuron	94125-34-5	#####	5115	Herbicide	Sulfonylurea
Pyrazosulfuron	98389-04-9	NA 205	NA 205	Herbicide	Sulfonylurea
Pyrazosulfuron-ethyl	93697-74-6	NA 218	NA 217	Herbicide	Sulfonylurea
Rimsulfuron	122931-48-0	#####	3835	Herbicide	Sulfonylurea
Siduron	1982-49-6	35509	603	Herbicide	Urea
Sulfometuron	74223-56-6	NA 206	NA 205	Herbicide	Sulfonylurea
Sulfometuron methyl	74222-97-2	#####	2149	Herbicide	Sulfonylurea
Sulfosulfuron	141776-32-1	85601	5136	Herbicide	Sulfonylurea
Tebuthiuron	34014-18-1	#####	1810	Herbicide	Urea
Teflubenzuron	83121-18-0	#####	NA 33	Insecticide	Benzoylurea
Tetrafluron	27954-37-6	#####	NA 145	Herbicide	Phenylurea
Thiazafluron	25366-23-8	NA 190	NA 189	Herbicide	Urea



Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Thidiazuron	51707-55-2	#####	2162	Defoliant, Plant Growth Regulator	Urea
Thifensulfuron	79277-67-1	NA 183	NA 182	Herbicide	Sulfonylurea
Thifensulfuron-methyl	79277-27-3	#####	2237	Herbicide	Sulfonylurea
Triasulfuron	82097-50-5	#####	5100	Herbicide	Sulfonylurea
Tribenuron	106040-48-6	NA 206	NA 205	Herbicide	Sulfonylurea
Tribenuron methyl	101200-48-0	#####	2338	Herbicide	Sulfonylurea
Triflumuron	64628-44-0	#####	2961	Insecticide	Benzoylurea
Triflusulfuron-methyl	126535-15-7	#####	3875	Herbicide	Sulfonylurea
Trimeturon	3050-27-9	#####	NA 121	Herbicide	Urea
Tritosulfuron	142469-14-5	NA 234	NA 234	Herbicide	Sulfonylurea
Bromacil	314-40-9	12301	83	Herbicide	Uracil
Bromacil, dimethylamine salt	69484-13-5	12304	840	Herbicide	Uracil
Bromacil, lithium salt	53404-19-6	12302	1573	Herbicide	Uracil
Bromacil, sodium salt	69484-12-4	12303	842	Herbicide	Uracil
Butafenacil	134605-64-4	#####	NA 992	Herbicide	Uracil
Flupropacil	120890-70-2	NA 229	NA 229	Herbicide	Uracil
Isocil	314-42-1	11801	NA 119	Herbicide	Uracil
Lenacil	95177	#####	NA 155	Herbicide	Uracil
Terbacil	5902-51-2	12701	532	Herbicide	Uracil
2-Hydroxy alachlor	NA 943	NA 183	2602	Breakdown product	Chloroacetanilide
3,4,5-tribromo salicylanilide, other related	NA 1122	NA 165	90833	Microbiocide	Anilide
3,5-dibromosalicylanilide	2577-72-2	77405	1256	Microbiocide	Anilide
5,4-dibromosalicylanilide	NA 1024	NA 122	1071	Microbiocide	Anilide
Aatram (propachlor with atrazine) (019101+080803)	8070-76-6	80816	NA 781	Herbicide	Triazine, Chloroacetanilide
Acetochlor	34256-82-1	#####	2349	Herbicide	Chloroacetanilide
Alachlor	15972-60-8	90501	678	Herbicide	Chloroacetanilide
Benodanil	15310-01-7	#####	NA 154	Fungicide	Anilide
Butachlor	23184-66-9	#####	4056	Herbicide	Chloroacetanilide
Butenachlor	87310-56-3	NA 206	NA 206	Herbicide	Chloroacetanilide
Clomeprop	84496-56-0	NA 204	NA 203	Herbicide	Anilide
Cyproflum	69581-33-5	NA 186	NA 185	Fungicide	Anilide
Cypromid	2759-71-9	26101	178	Herbicide	Anilide
Delachlor	24353-58-0	#####	NA 132	Herbicide	Chloroacetanilide
Diethatyl-ethyl	38727-55-8	#####	1995	Herbicide	Chloroacetanilide
Diflufenican	83164-33-4	NA 184	NA 183	Herbicide	Anilide
Dimethachlor	50563-36-5	NA 184	NA 183	Herbicide	Chloroacetanilide
Etobenzanid	79540-50-4	NA 229	NA 228	Herbicide	Anilide
Fenasulam	78357-48-9	NA 231	NA 231	Herbicide	Anilide
Flufenacet	142459-58-3	#####	5293	Herbicide	Anilide
Flufenican	NA 1568	NA 234	NA 234	Herbicide	Anilide
Flutolanil	66332-96-5	#####	2305	Fungicide	Anilide
Mefenacet	73250-68-7	NA 189	NA 188	Herbicide	Anilide
Mefluidide	53780-34-0	#####	5082	Herbicide, Plant Growth Regulator	Anilide
Mefluidide, diethanolamine salt	53780-36-2	#####	1955	Herbicide	Anilide
Mefluidide, potassium salt	83601-83-6	#####	5083	Herbicide	Anilide
Mepronil	55814-41-0	NA 189	NA 188	Fungicide	Anilide
Metazachlor	67129-08-2	NA 184	NA 183	Herbicide	Chloroacetanilide

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Metolachlor	51218-45-2	#####	1996	Herbicide	Chloroacetanilide
Metolachlor, (S)	87392-12-9	#####	5133	Herbicide	Chloroacetanilide
Monalide	7287-36-7	#####	NA 134	Herbicide	Anilide
Naproanilide	52570-16-8	NA 233	NA 232	Herbicide	Anilide
Ofurace	58810-48-3	NA 189	NA 188	Fungicide	Anilide
Oxadixyl	77732-09-3	#####	3539	Fungicide	Anilide
Perfluidone	37924-13-3	#####	1895	Herbicide	Anilide
Perfluidone, diethanolamine salt	NA 991	NA 671	1896	Herbicide	Anilide
Prétilachlor	51218-49-6	NA 184	NA 184	Herbicide	Chloroacetanilide
Propachlor	1918-16-7	19101	511	Herbicide	Chloroacetanilide
Propanil	709-98-8	28201	503	Herbicide	Anilide
Propisochlor	86763-47-5	NA 233	NA 233	Herbicide	Chloroacetanilide
Prynachlor	21267-72-1	#####	NA 138	Herbicide, Plant Growth Regulator	Chloroacetanilide
Pyracarbolid	24691-76-7	NA 210	NA 209	Fungicide	Anilide
Salicylanilide	87-17-2	77407	450	Fungicide, Microbiocide	Anilide
Sodium salicylanilide	251930	#####	NA 145	Fungicide	Anilide
Thenylchlor	96491-05-3	NA 229	NA 229	Herbicide	Chloroacetanilide
Triclocarban	101-20-2	27901	844	N/A	Anilide
1,2,4-triazole	288-88-0	NA 968	3560	N/A	Azole
1H-benzo triazole	95-14-7	NA 493	2418	N/A	Azole
2,2'-Dithiobisbenzothiazole	120-78-5	9202	NA 109	Fungicide, Microbiocide, Insecticide	Mercaptobenzothiazole
2-(2'-hydroxy-5-methyl phenyl)-benzotriazole	2440-22-4	NA 103	2607	Fungicide	Azole
2-(dithiocyanomethylthio)-benzothiazole	NA 1346	NA 192	NA 191	Fungicide	Mercaptobenzothiazole
2-(thiocyanomethylthio)benzothiazole with 2'-hydroxyethyl-2,3-dibromopropionate	79910-32-0	#####	NA 925	Microbiocide	Mercaptobenzothiazole
2-EEEEBC	62732-91-6	#####	1983	Fungicide	Benzimidazole
2-Mercaptobenzothiazole	149-30-4	51701	556	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, 1-(hydroxyethyl)pyridinium salt	5468-43-9	51702	NA 423	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, ferric salt	53404-53-8	51708	NA 426	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, manganese salt	53404-58-3	9201	NA 108	Fungicide, Microbiocide, Insecticide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, monoethanolammonium salt	5902-85-2	51706	NA 424	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, potassium salt	7778-70-3	51707	NA 425	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, sodium salt	2492-26-4	51704	3064	Microbiocide, Fungicide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, sodium salt	2492-26-4	51704	613	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, zinc salt	155-04-4	51705	1449	Fungicide, Microbiocide	Mercaptobenzothiazole, Inorganic-Zinc

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
5-Chloro-2-mercaptobenzothiazole	5331-91-9	NA 200	NA 199	N/A	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, lauryl pyridinium salt	5406-97-3	51703	1238	Microbiocide	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, lauryl pyridinium salt	5406-97-3	NA 421	1597	Microbiocide, Fungicide	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, zinc salt	53404-93-6	51709	NA 427	Microbiocide, Fungicide	Mercaptobenzothiazole, Inorganic-Zinc
Azaconazole	60207-31-0	#####	NA 105	Insecticide, Fungicide	Azole
Benomyl	17804-35-2	99101	1552	Fungicide	Benzimidazole
Bitertanol	55179-31-2	#####	NA 959	Fungicide	Azole
Bromuconazole	116255-48-2	#####	NA 8	Fungicide	Azole
Carbendazim	10605-21-7	#####	2176	Fungicide	Benzimidazole
Carbendazim hydrochloride	37574-18-8	#####	NA 121	Fungicide	Benzimidazole
Carbendazim phosphate	52316-55-9	99102	1974	Fungicide	Benzimidazole
CGA-64251	60207-93-4	#####	2452	Fungicide	Azole
Chlorfenapyr	122453-73-0	#####	3938	Insecticide	Pyrazole
Chlorflurazole	3615-21-2	#####	NA 139	N/A	Benzimidazole
Cyazofamid	120116-88-3	NA 216	NA 215	Fungicide	Azole
Cypendazole	28559-00-4	#####	NA 156	N/A	Benzimidazole
Cyproconazole	94361-06-5	#####	5105	Fungicide	Azole
Difenoconazole	119446-68-3	#####	5024	Fungicide	Azole
Diniconazole	83657-18-5	#####	2500	Fungicide	Azole
Diniconazole (stereochemistry unspecified)	83657-24-3	NA 200	NA 200	Fungicide	Azole
Fenapanil	61019-78-1	#####	2083	Fungicide	Azole
Fenbuconazole	114369-43-6	#####	3905	Fungicide	Azole
Fluotrimazole	31251-03-3	NA 207	NA 207	Fungicide	Azole
Fluquinconazole	136426-54-5	NA 184	NA 183	Fungicide	Azole
Flusilazole	85509-19-9	#####	2278	Fungicide	Azole
Flutriafol	76674-21-0	#####	NA 107	Fungicide	Azole
Fuberidazole	3878-19-1	#####	NA 150	Fungicide	Benzimidazole
Furconazole	112839-33-5	NA 196	NA 196	Fungicide	Azole
Furconazole-cis	112839-32-4	NA 208	NA 207	Fungicide	Azole
Hexaconazole	79983-71-4	#####	NA 23	Fungicide	Azole
Imazalil	35554-44-0	#####	2084	Fungicide	Azole
Imazalil sulfate	58594-72-2	#####	NA 921	Fungicide	Azole
Imibenconazole	86598-92-7	NA 205	NA 204	Fungicide	Azole
Isoxachlortole	141112-06-3	NA 232	NA 232	Herbicide	Cyclopropylisoxazole
Metconazole	125116-23-6	#####	NA 101	Fungicide	Azole
Metronidazole	443-48-1	#####	2208	Microbiocide	Azole
Myclobutanil	88671-89-0	#####	2245	Fungicide	Azole
Naphthyl triazole stilbene monosulfonate	NA 742	NA 135	2698	N/A	Azole
Paclobutrazol	76738-62-0	#####	2259	Plant Growth Regulator	Azole
Penconazole	66246-88-6	#####	NA 109	Fungicide	Azole
Prochloraz	67747-09-5	#####	NA 29	Fungicide	Azole
Prochloraz - manganese complex (4:1)	75747-77-2	#####	NA 104	Fungicide	Azole

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Prochloraz zinc complex	NA 1555	NA 226	NA 226	Fungicide	Azole
Propiconazole	60207-90-1	#####	2276	Fungicide	Azole
Pyrazoxyfen	71561-11-0	NA 189	NA 189	Herbicide	Pyrazole
R 23 979 imazalil base	NA 451	NA 809	2844	Fungicide	Azole
TCMTB	21564-17-0	35603	971	Microbiocide, Fungicide	Mercaptobenzothiazole
Tebuconazole	107534-96-3	#####	3850	Fungicide	Azole
Tebufenpyrad	119168-77-3	90102	NA 845	Insecticide	Pyrazole
Terrazole	2593-15-9	84701	580	Fungicide	Azole
Tetraconazole	112281-77-3	#####	NA 979	Fungicide	Azole
Thiabendazole	148-79-8	60101	587	Fungicide	Benzimidazole
Thiabendazole, hypophosphite salt	28558-32-9	60102	1952	Fungicide	Benzimidazole
Thiophanate	23564-06-9	#####	1684	Fungicide	Benzimidazole
Thiophanate-methyl	23564-05-8	#####	1696	Fungicide	Benzimidazole precursor
Tolyl triazole	29395-43-1	NA 962	2950	N/A	Azole
Triadimefon	43121-43-3	#####	2133	Fungicide	Azole
Triadimenol	55219-65-3	#####	2307	Fungicide, Breakdown product	Azole
Triazbutil	16227-10-4	#####	NA 931	Fungicide	Azole
Tricyclazole	41814-78-2	#####	5002	Fungicide	Azole
Triflumizole	68694-11-1	#####	2260	Fungicide	Azole
Triflumizole	99387-89-0	NA 201	NA 201	Fungicide	Azole
Triticonazole	131983-72-7	#####	NA 101	Fungicide	Azole
Uniconazole	83657-22-1	#####	NA 38	Plant Growth Regulator	Azole
2-EEEBC	62732-91-6	#####	1983	Fungicide	Benzimidazole
Benomyl	17804-35-2	99101	1552	Fungicide	Benzimidazole
Carbendazim	10605-21-7	#####	2176	Fungicide	Benzimidazole
Carbendazim hydrochloride	37574-18-8	#####	NA 121	Fungicide	Benzimidazole
Carbendazim phosphate	52316-55-9	99102	1974	Fungicide	Benzimidazole
Chlorflurazole	3615-21-2	#####	NA 139	N/A	Benzimidazole
Cypendazole	28559-00-4	#####	NA 156	N/A	Benzimidazole
Fuberidazole	3878-19-1	#####	NA 150	Fungicide	Benzimidazole
Thiabendazole	148-79-8	60101	587	Fungicide	Benzimidazole
Thiabendazole, hypophosphite salt	28558-32-9	60102	1952	Fungicide	Benzimidazole
Thiophanate	23564-06-9	#####	1684	Fungicide	Benzimidazole
Thiophanate-methyl	23564-05-8	#####	1696	Fungicide	Benzimidazole precursor
1-(3-chlorophthalimido)cyclohexane carboxamide	51971-67-6	#####	NA 110	N/A	Carboxamide
Carboxin	5234-68-4	90201	1755	Fungicide	Carboxamide
Cisanilide	34484-77-0	#####	NA 144	Herbicide	Carboxamide
Cyclafuramide	34849-42-8	#####	NA 132	Fungicide	Carboxamide
Fenfuram	24691-80-3	NA 188	NA 187	Fungicide	Carboxamide
Furmecyclox (Xyligen B)	60568-05-0	#####	NA 18	Fungicide	Carboxamide
Methfuroxam	28730-17-8	#####	NA 949	Fungicide	Carboxamide
Metsulfovax	21452-18-6	NA 189	NA 188	Fungicide	Carboxamide
Nitrofurazone (not subject to FIFRA : 8709-e pm 24)	59-87-0	#####	NA 128	N/A	Carboxamide

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Oxycarboxin	5259-88-1	90202	1434	Fungicide	Carboxamide
p-Benzoquinone semicarbazone	61566-21-0	#####	NA 133	N/A	Carboxamide
Chlozolinate	72391-46-9	NA 183	NA 182	Fungicide	Dicarboximide
Iprodione	36734-19-7	#####	2081	Fungicide	Dicarboximide
Myclozolin	54864-61-8	NA 209	NA 208	Fungicide	Dicarboximide
N-(2-Ethylhexyl)-1-isopropyl-4-methyl-4-cyclohexene-1,2-dicarboximide	13358-11-7	#####	NA 121	Synergist	Dicarboximide
N-octyl bicycloheptene dicarboximide	113-48-4	57001	396	Synergist	Dicarboximide
Vinclozolin	50471-44-8	#####	2129	Fungicide	Dicarboximide
Calcium ethylenebis(dithiocarbamate)	5895-18-1	14501	NA 139	Microbiocide	Dithiocarbamate
Cufraneb	11096-18-7	NA 181	NA 180	Fungicide	Dithiocarbamate
Diammonium ethylenebis(dithiocarbamate)	607313	14502	NA 140	Microbiocide	Dithiocarbamate
Ferbam	14484-64-1	34801	288	Fungicide	Dithiocarbamate
Ferric nitroso dimethyl dithiocarbamate	83542-83-0	#####	NA 149	Microbiocide	Dithiocarbamate
Mancopper	53988-93-5	NA 181	NA 180	Fungicide	Dithiocarbamate
Mancozeb	2233100	14504	211	Fungicide	Dithiocarbamate, Inorganic-Zinc
Maneb	12427-38-2	14505	369	Fungicide	Dithiocarbamate
Maneb and nickel sulfate hexahydrate (014505 + 050505)	8005-46-7	#####	NA 158	Fungicide	Dithiocarbamate, Inorganic-Nickel
Manganous dimethyldithiocarbamate	15339-36-3	34802	NA 304	Fungicide	Dithiocarbamate
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Metam sodium, dihydrate	137-42-8	39003	NA 163	Fumigant, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Metam-sodium	6734-80-1	39003	616	Fumigant, Herbicide, Fungicide, Microbiocide, Algaecide, Nematicide	Dithiocarbamate
Metiram	9006-42-2	14601	493	Fungicide	Dithiocarbamate, Inorganic-Zinc
Morpholinomethyl dimethyldithiocarbamate	31848-11-0	#####	NA 158	Microbiocide	Dithiocarbamate
Nabam	142-59-6	14503	417	Fungicide, Herbicide	Dithiocarbamate
Phenylmercuric dimethyldithiocarbamate	32407-99-1	66008	NA 555	Microbiocide, Fungicide	Organomercury, Dithiocarbamate, Heavy metal
Potassium ammonium ethylenebis(dithiocarbamate)	22221-14-3	14507	NA 141	Microbiocide	Dithiocarbamate
Potassium dimethyl dithio carbamate	128-03-0	34803	1934	Microbiocide	Dithiocarbamate

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Potassium N-hydroxymethyl-N-methyldithio carbamate	51026-28-9	#####	1824	N/A	Dithiocarbamate
Potassium N-methyldithio carbamate	137-41-7	39002	970	Fumigant, Fungicide, Microbiocide, Algicide, Nematicide	Dithiocarbamate
Propineb	12071-83-9	#####	NA 155	Fungicide, Microbiocide	Dithiocarbamate, Inorganic-Zinc
Sodium dimethyl dithio carbamate	128-04-1	34804	548	Fungicide	Dithiocarbamate
Sulfallate	95-06-7	39001	115	Herbicide	Dithiocarbamate
Tert-butyl dimethyl trithio peroxy carbamate	3304-97-0	34807	1383	Rodent Repellent	Dithiocarbamate
Tert-butyl dimethyl trithio peroxy carbamate, other related	NA 1130	NA 166	91383	N/A	Dithiocarbamate
Thiram	137-26-8	79801	589	Fungicide	Dithiocarbamate
Thiram and NAD and IBA and 2-methyl-1-naphthaleneacetamide and 2-methyl-1-naphthaleneacetic acid	75497-92-6	56011	NA 463	Fungicide, Plant Growth Regulator	Dithiocarbamate
Tricopper dichloride dimethyldithiocarbamate	7076-63-3	#####	NA 152	Microbiocide	Dithiocarbamate, Inorganic-Copper
Zineb	12122-67-7	14506	627	Fungicide	Dithiocarbamate, Inorganic-Zinc
Zineb-ethylene thiuram disulfide adduct	NA 1465	NA 217	NA 216	Fungicide	Dithiocarbamate, Inorganic-Zinc
Ziram	137-30-4	34805	629	Fungicide, Microbiocide, Dog and Cat Repellent	Dithiocarbamate, Inorganic-Zinc
Ziram, cyclohexylamine complex	16509-79-8	34806	1328	Dog and Cat Repellent, Fungicide	Dithiocarbamate, Inorganic-Zinc
2,2'-Dithiobisbenzothiazole	120-78-5	9202	NA 109	Fungicide, Microbiocide, Insecticide	Mercaptobenzothiazole
2-(dithiocyanomethylthio)-benzothiazole	NA 1346	NA 192	NA 191	Fungicide	Mercaptobenzothiazole
2-(thiocyanomethylthio)benzothiazole with 2'-hydroxyethyl-2,3-dibromopropionate	79910-32-0	#####	NA 925	Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole	149-30-4	51701	556	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, 1-(hydroxyethyl)pyridinium salt	5468-43-9	51702	NA 423	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, ferric salt	53404-53-8	51708	NA 426	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, manganese salt	53404-58-3	9201	NA 108	Fungicide, Microbiocide, Insecticide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, monoethanolammonium salt	5902-85-2	51706	NA 424	Fungicide, Microbiocide	Mercaptobenzothiazole

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2-Mercaptobenzothiazole, potassium salt	7778-70-3	51707	NA 425	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, sodium salt	2492-26-4	51704	3064	Microbiocide, Fungicide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, sodium salt	2492-26-4	51704	613	Fungicide, Microbiocide	Mercaptobenzothiazole
2-Mercaptobenzothiazole, zinc salt	155-04-4	51705	1449	Fungicide, Microbiocide	Mercaptobenzothiazole, Inorganic-Zinc
5-Chloro-2-mercaptobenzothiazole	5331-91-9	NA 200	NA 199	N/A	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, lauryl pyridinium salt	5406-97-3	51703	1238	Microbiocide	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, lauryl pyridinium salt	5406-97-3	NA 421	1597	Microbiocide, Fungicide	Mercaptobenzothiazole
5-Chloro-2-mercaptobenzothiazole, zinc salt	53404-93-6	51709	NA 427	Microbiocide, Fungicide	Mercaptobenzothiazole, Inorganic-Zinc
TCMTB	21564-17-0	35603	971	Microbiocide, Fungicide	Mercaptobenzothiazole
Ancymidol	12771-68-5	#####	1744	Plant Growth Regulator	Pyrimidine
Bupirimate	41483-43-6	#####	2430	Fungicide	Pyrimidine
Cloransulam	159518-97-5	NA 231	NA 231	Herbicide	Triazolopyrimidine
Cloransulam-methyl	147150-35-4	#####	NA 112	Herbicide	Triazolopyrimidine
Dimethirimol	5221-53-4	#####	NA 128	Fungicide	Pyrimidine
Ethirimol	23947-60-6	#####	NA 129	Fungicide	Pyrimidine
Fenarimol	60168-88-9	#####	1980	Fungicide	Pyrimidine
Ferimzone	89269-64-7	NA 203	NA 202	Fungicide	Pyrimidine
Flurprimidol	56425-91-3	#####	2320	Plant Growth Regulator	Pyrimidine
Nuarimol	63284-71-9	#####	NA 126	Fungicide	Pyrimidine
Pyrimethanil	53112-28-0	#####	NA 30	Fungicide	Pyrimidine
Azoxystrobin	131860-33-8	#####	4037	Fungicide	Strobin
Dimoxystrobin	149961-52-4	NA 211	NA 210	Fungicide	Strobin
Kresoxim-methyl	143390-89-0	#####	5451	Fungicide	Strobin
Metominostrobin	133408-50-1	NA 211	NA 210	Fungicide	Strobin
Picoxystrobin	117428-22-5	NA 211	NA 210	Fungicide	Strobin
Pyraclostrobin	175013-18-0	NA 211	NA 210	Fungicide	Strobin
Trifloxystrobin	141517-21-7	#####	5321	Fungicide	Strobin
Chloroneb	2675-77-6	27301	135	Fungicide	Substituted Benzene
Chlorothalonil	1897-45-6	81901	677	Fungicide	Substituted Benzene
Dichlobenil	1194-65-6	27401	112	Herbicide	Substituted Benzene
Dichloran	99-30-9	31301	81	Fungicide	Substituted Benzene
PCNB	82-68-8	56502	464	Fungicide, Nematicide, Algaecide	Substituted Benzene
PCNB, other related	NA 1100	NA 163	90464	Fungicide, Algaecide, Nematicide	Substituted Benzene
Captafol	190444	81702	NA 787	Fungicide	Thiophthalimide
Captafol (cis isomer)	2939-80-2	81701	292	Fungicide	Thiophthalimide
Captan	133-06-2	81301	104	Fungicide	Thiophthalimide
Captan, other related	NA 1074	NA 161	90104	Fungicide	Thiophthalimide

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Folpet	133-07-3	81601	294	Fungicide	Thiophthalimide
Merpafol cis isomer	190444	81701	NA 163	Fungicide	Thiophthalimide
Benalaxyl	71626-11-4	#####	NA 102	Fungicide	Xylylalanine
Furalaxyl	57646-30-7	NA 188	NA 188	Fungicide	Xylylalanine
L-Metalaxyl	69516-34-3	#####	NA 929	Fungicide	Xylylalanine
Mefenoxam	70630-17-0	#####	4011	Fungicide	Xylylalanine
Mefenoxam, other related	NA 1152	NA 168	94011	Fungicide	Xylylalanine
Metalaxyl	57837-19-1	#####	2132	Fungicide	Xylylalanine
Metalaxyl-M	70630-17-0	NA 219	NA 218	Fungicide	Xylylalanine
1-(Alkyl* amino)-3-aminopropane *(47%C12, 18%C14, 10%C18, 9%C10, 8%C16, 8%C8)	61791-67-1	67311	NA 586	Microbiocide	Alkyl Amino Propane
1-(Alkyl* amino)-3-aminopropane *(as in fatty acids of coconut oil)	61791-63-7	67301	NA 583	Microbiocide	Alkyl Amino Propane
1-(Alkyl* amino)-3-aminopropane diacetate *(37%C18', 29%C16, 23%C18, 3%C16', 3%C14, 1.5%C18'', 1%C14', 1%C12, 0.5%C15)	68911-78-4	67306	NA 585	Microbiocide	Alkyl Amino Propane
1-(Alkyl* amino)-3-aminopropane diacetate *(as in fatty acids of coconut oil)	NA 1191	67313	NA 167	Microbiocide	Alkyl Amino Propane
1-(Alkyl* amino)-3-aminopropane monoacetate *(47%C12, 18%C14, 10%C18, 9%C10, 8%C16, 8%C8)	NA 1192	67319	NA 167	Microbiocide, Algaecide	Alkyl Amino Propane
1-(Alkyl* amino)-3-aminopropane propionate-copper acetate complex	NA 1193	67304	NA 167	Microbiocide	Alkyl Amino Propane
1-(alkyl-amino)-3-aminopropane hydrochloride	NA 1494	NA 221	NA 221	Microbiocide	Alkyl Amino Propane
1-(alkylamino)-3-aminopropane	68155-37-3	67310	1830	Microbiocide	Alkyl Amino Propane
1-(alkylamino)-3-carboxymethylaminopropane	NA 1495	NA 221	NA 221	Microbiocide	Alkyl Amino Propane
1-Alkyl (C6 to C18) amino-3-aminopropane acetate	NA 994	NA 721	2365	Microbiocide	Alkyl Amino Propane
1-alkyl (C6-C18) amino-3-aminopropane diacetate	61791-64-8	67302	1954	Microbiocide	Alkyl Amino Propane
1-alkylamino-2-aminopropane monoacetate, alkyl derived from coconut oil fatty acids	61791-64-8	67302	1335	Microbiocide	Alkyl Amino Propane
1-Alkylamino-3-aminopropane hydroxyacetate, alkyl derived from coconut oil fatty acids	68155-43-1	67309	1972	Microbiocide, Soap/Surfactant	Alkyl Amino Propane
Alkyl (53%C12, 19%C14, 8.5%C16, 7%C8, 6.5%C10, 6%C18)-1,3-propane diamine	61791-58-0	67305	1780	Microbiocide	Alkyl Amino Propane
Alkyl-1,3-propylene diamine acetate, alkyl derived from coconut oil fatty acids	61790-63-7	NA 558	1380	Microbiocide, Soap/Surfactant	Alkyl Amino Propane
Alkyl-1,3-propylene diamine adipate, alkyl derived from	68155-42-0	#####	1841	Microbiocide, Soap/Surfactant	Alkyl Amino Propane



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coconut oil fatty acids					
Alkyl-1,3-propylene diamine, alkyl derived from coconut oil fatty acids	NA 287	NA 559	1379	Microbiocide, Soap/Surfactant	Alkyl Amino Propane
N-(2-cyanoethyl)-N-alkyl (C6-C18)-1,3-diamino propane	NA 187	67321	1957	Adjuvant	Alkyl Amino Propane
N-Alkyl-1,3-propylene diamine monobenzoate, alkyl derived from coconut oil fatty acids	68188-29-4	67307	1735	Microbiocide, Soap/Surfactant	Alkyl Amino Propane
Tall oil fatty acid soap of N-alkyl (C16-C18) propyl diamine	61790-55-4	NA 924	3463	Microbiocide, Insecticide	Alkyl Amino Propane
2,2'-Methylenebis(4,6-dichlorophenol)	1940-43-8	55004	NA 455	Microbiocide	Chlorinated Phenol
2,2'-Thiobis(4,6-dichlorophenol)	97-18-7	64201	NA 539	N/A	Chlorinated Phenol
2,2,2-Trichloro-N-(pentachlorophenyl)acetimidoyl chloride	3583-63-9	#####	NA 151	N/A	Chlorinated Phenol
2,2-methylene bis(4,6-dichlorophenol), sodium salt	68957-70-0	55006	1843	Microbiocide	Chlorinated Phenol
2,3,4,6-tetrachlorophenol, potassium salt	53535-27-6	63007	1725	Wood Preservative, Fungicide	Chlorinated phenol
2,4,5-trichlorophenol	95-95-4	64210	1382	Microbiocide, Algacide	Chlorinated phenol
2,4,5-Trichlorophenol salt of 2,6-bis((dimethylamino)methyl)cyclohexanone	53404-83-4	64211	NA 542	N/A	Chlorinated Phenol
2,4,5-trichlorophenol, potassium salt	35471-43-3	64204	1050	Microbiocide	Chlorinated phenol
2,4,5-trichlorophenol, potassium salt, other related	NA 1128	NA 166	91050	Microbiocide	Chlorinated phenol
2,4,5-trichlorophenol, sodium salt	136-32-3	64217	1656	Microbiocide	Chlorinated phenol
2,4,5-Trichlorophenol, sodium salt	3784-03-0	64220	NA 545	Microbiocide, Algacide	Chlorinated Phenol
2,4,6-trichlorophenol	88-06-2	64212	640	Microbiocide	Chlorinated phenol
2,4-dichlorophenol	120-83-2	NA 105	2499	N/A	Chlorinated phenol
2-(trichlorophenoxy)ethyl hydrogen sulfate	69633-04-1	#####	NA 152	Herbicide	Chlorinated Phenol
2-chloro-4-phenylphenol	92-04-6	62206	846	Microbiocide	Chlorinated Phenol
2-chloro-4-phenylphenol, potassium salt	18128-16-0	62207	1061	Microbiocide	Chlorinated Phenol
2-chloro-4-phenylphenol, sodium salt	31366-97-9	62215	1632	Microbiocide	Chlorinated Phenol
2-Chlorophenol	95-57-8	62204	NA 504	Microbiocide	Chlorinated Phenol
3-chloro-2-biphenylol, sodium salt	10605-11-5	62213	NA 505	Microbiocide	Chlorinated Phenol
4 & 6 - chloro-2-phenylphenol	NA 964	NA 419	1566	Microbiocide	Chlorinated Phenol
4 & 6 - chloro-2-phenylphenol, potassium salts, mixed	NA 965	NA 420	1604	Microbiocide	Chlorinated Phenol
4 & 6 - chloro-2-phenylphenol, sodium salts, mixed	NA 963	NA 413	1594	Microbiocide	Chlorinated Phenol
4 & 6-chloro-2-phenylphenol,	NA 1132	NA 166	91566	Microbiocide	Chlorinated phenol

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other related					
4 or 6-chloro-2-phenylphenol	53537-62-5	62216	NA 507	Microbiocide	Chlorinated Phenol
4 or 6-chloro-2-phenylphenol, diethanolamine salt	53537-63-6	62214	NA 506	Microbiocide	Chlorinated Phenol
4,6-dichloro-2-phenylphenol	5335-24-0	64216	1062	Microbiocide	Chlorinated phenol
4,6-dichloro-2-phenylphenol, potassium salt	53404-30-1	64215	1059	Microbiocide	Chlorinated phenol
4-chloro-2-cyclopentyl phenol, potassium salt	35471-38-6	64214	1237	Microbiocide, Fungicide	Chlorinated phenol
4-chloro-2-cyclopentylphenol	13347-42-7	64202	836	Microbiocide, Fungicide	Chlorinated phenol
4-chloro-2-phenylphenol	607-12-5	62208	945	Microbiocide	Chlorinated Phenol
4-chloro-2-phenylphenol, potassium salt	53404-21-0	62209	947	Microbiocide	Chlorinated Phenol
4-chloro-2-phenylphenol, sodium salt	10605-10-4	62212	946	Microbiocide	Chlorinated Phenol
4-chloro-cyclopentylphenol, sodium salt	53404-20-9	64218	1395	Microbiocide, Fungicide	Chlorinated phenol
6-chloro-2-phenylphenol	85-97-2	62210	948	Microbiocide	Chlorinated Phenol
6-chloro-2-phenylphenol, potassium salt	18128-17-1	62211	950	Microbiocide	Chlorinated Phenol
6-chloro-2-phenylphenol, sodium salt	63992-41-6	NA 414	949	N/A	Chlorinated phenol
6-chlorothymol	89-68-9	80403	NA 775	N/A	Chlorinated Phenol
6-tert-Butyl-4-chloro-m-cresol	30894-16-7	#####	NA 127	Microbiocide	Chlorinated Phenol
Chlorbisan	4418-66-0	64208	127	Microbiocide	Chlorinated Phenol
Chloroxylenol	88-04-0	86801	925	Microbiocide	Chlorinated phenol
Copper pentachlorophenate	15773-35-0	63011	NA 512	Wood Preservative, Microbiocide, Algacide, Fungicide	Chlorinated Phenol, Inorganic-Copper
Dehydroabietylamine pentachlorophenate	35109-57-0	4202	NA 72	Wood Preservative, Microbiocide, Algacide, Fungicide	Chlorinated Phenol
Dichlorophene	97-23-4	55001	206	Herbicide, Fungicide, Microbiocide	Chlorinated Phenol
Disodium 2,2'-methylenebis(3,4,6-trichlorophenate)	3247-34-5	44903	NA 380	N/A	Chlorinated Phenol
Ethylmercury pentachlorophenate	22232-28-6	41504	NA 359	Microbiocide	Organomercury, Chlorinated Phenol, Heavy metal
Fenticlor	97-24-5	64209	NA 541	Microbiocide	Chlorinated Phenol
Hexachlorophene	70-30-4	44901	322	Microbiocide, Fungicide	Chlorinated Phenol
Hexachlorophene, sodium salt	5736-15-2	44902	413	Microbiocide	Chlorinated Phenol
Ortho-benzyl-para-chlorophenol	120-32-1	62201	522	Microbiocide, Fungicide	Chlorinated phenol
Ortho-benzyl-para-chlorophenol, potassium salt	35471-49-9	62202	936	Microbiocide	Chlorinated phenol
Ortho-benzyl-para-chlorophenol, sodium salt	3184-65-4	62203	937	Microbiocide, Fungicide	Chlorinated phenol

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Para-chloro-meta-cresol	59-50-7	64206	1813	Microbiocide, Fungicide	Chlorinated Phenol
para-Chloro-ortho-cresol	1570-64-5	62190	NA 503	N/A	Chlorinated Phenol
Para-chlorophenol	106-48-9	NA 124	1572	N/A	Chlorinated phenol
PCP	87-86-5	63001	465	Wood Preservative, Microbiocide, Algicide, Fungicide, Molluscicide, Herbicide	Chlorinated Phenol
PCP, other related	NA 1101	NA 163	90465	Wood Preservative, Microbiocide, Algicide, Fungicide, Molluscicide	Chlorinated Phenol
PCP, potassium salt	7978-73-6	63002	1049	Wood Preservative, Microbiocide, Algicide, Fungicide, Molluscicide	Chlorinated Phenol
PCP, sodium salt	131-52-2	63003	540	Wood Preservative, Microbiocide, Algicide, Fungicide, Molluscicide	Chlorinated Phenol
PCP, sodium salt, other related	NA 1110	NA 164	90540	Wood Preservative, Microbiocide, Algicide, Fungicide, Molluscicide	Chlorinated Phenol
Pentachlorophenol, zinc salt	2917-32-0	63008	NA 510	Wood Preservative, Microbiocide, Algicide, Fungicide	Chlorinated Phenol, Inorganic-Zinc
Pentachlorophenyl laurate	3772-94-9	63010	NA 511	Wood Preservative, Microbiocide, Algicide, Fungicide	Chlorinated Phenol
Potassium 2,2'-methylenebis(3,4,6-trichlorophenate)	67923-62-0	44904	NA 381	Microbiocide	Chlorinated Phenol
Potassium 2,4,6-trichlorophenate	2591-21-1	64219	NA 544	Microbiocide	Chlorinated Phenol
Potassium ortho-cyclopentyl-para-chlorophenate	35471-38-6	64214	1542	Microbiocide, Fungicide	Chlorinated phenol
Sodium 2,2'-methylenebis(4-chlorophenate)	10254-48-5	55005	NA 456	Insecticide, Fungicide, Microbiocide	Chlorinated Phenol
Sodium chlorophenates	35535-81-0	62205	773	N/A	Chlorinated Phenol
Sodium dichlorophenate	NA 1399	NA 197	NA 196	Fungicide,	Chlorinated Phenol

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				Microbiocide	
Sodium p-chloro-m-cresolate	15733-22-9	64205	NA 540	Microbiocide	Chlorinated Phenol
Tetrachlorophenol	25167-83-3	63004	777	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, alkylamine salt	NA 1007	NA 938	1401	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, coconut amine salt	NA 1008	NA 939	1455	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, other related	NA 1118	NA 165	90777	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, potassium salt	53535-27-6	63007	1753	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, sodium salt	25567-55-9	63005	776	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenol, sodium salt, other related	NA 1117	NA 165	90776	Wood Preservative, Fungicide	Chlorinated phenol
Tetrachlorophenols, alkyl* amine salt *(as in fatty acids of coconut oil)	137543-70-5	63006	NA 509	Wood Preservative, Fungicide	Chlorinated Phenol
Trichlorophenol	95-95-4	64210	1189	Microbiocide, Algaecide	Chlorinated phenol
Trichlorophenol, sodium salt	136-32-3	64217	960	Microbiocide, Algaecide	Chlorinated phenol
Trichlorophenol, sodium salt, other related	NA 1127	NA 166	90960	Microbiocide	Chlorinated phenol
Triclosan	3380-34-5	54901	1371	Microbiocide	Chlorinated Phenol
Vancide 30-R	6385-58-6	64203	612	Microbiocide	Chlorinated Phenol
Zinc 2,4,5-trichlorophenate	136-24-3	64221	NA 546	N/A	Chlorinated Phenol, Inorganic-Zinc
Zinc trichlorophenate	30143-22-7	64213	NA 543	Microbiocide	Chlorinated Phenol, Inorganic-Zinc
1,3-bis (dihydroxymethyl)-5,5-dimethylhydantoin	6440-58-0	#####	2298	Fungicide, Herbicide, Microbiocide	Hydantoin
1,3-dibromo-5,5-dimethylhydantoin	77-48-5	6317	4036	Microbiocide, Fungicide, Herbicide	Hydantoin
1,3-dichloro-5,5-dimethylhydantoin	118-52-5	28501	37	Microbiocide, Fungicide, Herbicide	Hydantoin
1,3-Dichloro-5-ethyl-5-methylhydantoin	89415-87-2	#####	2264	Microbiocide, Fungicide, Herbicide	Hydantoin
1-bromo-3-chloro-5,5-dimethyl hydantoin	16079-88-2	6315	2080	Microbiocide, Fungicide, Herbicide	Hydantoin
1-Hydroxymethyl-5,5-dimethyl hydantoin	116-25-6	#####	2306	Fungicide, Herbicide, Microbiocide	Hydantoin

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3-Bromo-1-chloro-5,5-dimethylhydantoin	126-06-7	6322	NA 92	Microbiocide, Fungicide, Herbicide	Hydantoin
3-Hydroxymethyl-5,5-dimethyl hydantoin	NA 1478	NA 220	NA 219	Fungicide	Hydantoin
Dimethylol dimethyl hydantoin	6440-58-0	#####	2524	Fungicide, Herbicide, Microbiocide	Hydantoin
Acetalized polyvinyl alcohol complexed with iodine	NA 1185	46926	NA 166	Microbiocide	Iodine Compound
Alkyl (29%C14, 29%C13, 21%C12, 21%C15) poly(oxypropylene) poly(oxyethylene) - iodine complex	NA 973	NA 557	2063	Microbiocide	Iodine Compound
Alkyl (C12-C15)-poly(oxypropylene) poly(oxyethylene) - iodine complex	NA 972	NA 556	1734	Microbiocide	Iodine Compound
Alkyl(C12-C15) poly(oxypropylene)poly(oxyethylene)-iodine complex	NA 1195	46918	NA 168	Microbiocide	Iodine Compound
Alkyl* (ethyl cycloimidinium) 3-hydroxy-3-ethyl sodium alcoholate, 2-methyl sodium carboxylate-tridecyl polyoxyethylene ethanol	NA 1211	46906	NA 169	Microbiocide	Iodine Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride polyethoxypolypropoxypolyethoxyethanol - iodine complex *(50%C12, 30%C14, 1	NA 1198	46907	NA 168	Microbiocide, Microbiocide	Iodine Compound, Quaternary Ammonium Compound
Alkyl* poly(oxypropylene)poly(oxyethylene)-iodine complex *(43%C10, 30%C14, 12%C12, 10%C16, 5%C18)	NA 1214	46925	NA 170	Microbiocide	Iodine Compound
Butoxy polypropoxy polyethoxy ethanol - iodine complex	68610-00-4	46901	1633	Microbiocide	Iodine Compound
Diethanolamine myristate - iodine complex	53404-40-3	46910	NA 406	Microbiocide	Iodine Compound
Iodophors	39392-86-4	NA 213	NA 212	Microbiocide	Iodine Compound
Nonyl phenoxy poly(oxyethylene) amine sulfonate ethanol - iodine	NA 927	NA 39	1610	Microbiocide	Iodine Compound
Nonyl phenoxy polyoxyethylene ethanol-iodine complex	35860-86-7	46903	870	Microbiocide	Iodine Compound, Polyalkyloxy Compound
Octylphenoxy polyethoxy ethanol - iodine complex	53404-04-9	46915	2172	Microbiocide, Fungicide, Herbicide	Iodine Compound
Poly oxyethylene ethanol monoesters of 5- (and 6-) carboxy-4-hexyl-2-cyclohexene-1-octanoic acid, complex with iodine	82010-75-1	46924	2261	Microbiocide	Iodine Compound

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Poly propoxy poly ethoxy ethanol, I2 complex	NA 232	NA 453	1828	Microbiocide	Iodine Compound
Polyethoxy polypropoxy polyethoxy ethanol - iodine complex	26617-87-8	46904	1585	Microbiocide	Iodine Compound
Polyethoxy polypropoxy polyethoxy ethanol - iodine complex	NA 1286	46909	NA 174	Microbiocide	Iodine Compound
Polyethoxypolypropoxypolyethoxyethanol-n-alkyl (54% C12, 18% C14, 9% C16, 9% C18, 5% C10, 5% C8) di(beta-hydroxyethyl) benzyl am	NA 1287	46913	NA 175	Microbiocide	Iodine Compound, Quaternary Ammonium Compound
Polyethylene glycol ether of linear secondary alcohol - iodine complex	68439-47-4	46921	2121	Microbiocide	Iodine Compound
Polyvinyl pyrrolidone - iodine complex	25655-41-8	46914	1611	Microbiocide	Iodine Compound
Sodium dodecylbenzene sulfonate - iodine complex	53467-01-9	46920	1569	Microbiocide	Iodine Compound
Sodium N-alkyl-N-palmitoyl taurate-iodine complex	NA 290	NA 562	1568	Microbiocide	Iodine Compound
Sodium N-cyclohexyl-N-palmitoyl taurate - iodine complex	53404-81-2	46919	2089	Microbiocide	Iodine Compound
Tetraglycine hydroperiodide	7097-60-1	46923	1923	Microbiocide	Iodine Compound
Tridecylpoly(ethyleneoxy)ethanol - iodine complex	53404-05-0	46911	NA 407	Microbiocide	Iodine Compound
Triethanolamine octylsulfate - iodine complex	82010-77-3	46922	NA 409	Microbiocide	Iodine Compound
2-(4-chlorophenylmethyl)-3(2H)-isothiazolone	26530-09-6	#####	NA 125	Microbiocide	Isothiazolone
2-cyclohexyl-4,5-dichloro-4-isothiazolin-3-one	57063-29-3	#####	NA 166	Insecticide	Isothiazolone
2-cyclohexyl-4,5-dichloro-4-isothiazolin-3-one	57063-29-3	#####	NA 938	Insecticide	Isothiazolone
2-Methyl-3(2H)-isothiazolone, calcium chloride complex	57373-20-3	#####	NA 895	Microbiocide	Isothiazolone
2-methyl-4,5-trimethylene-4-isothiazolin-3-one	82633-79-2	#####	5013	Microbiocide	Isothiazolone
2-methyl-4-isothiazolin-3-one	2682-20-4	#####	2039	Microbiocide	Isothiazolone
3(2H)-chloro-2-methyl-3(2H)-isothiazolone, calcium chloride complex	57373-19-0	#####	NA 894	Microbiocide	Isothiazolone
4,5-dichloro-2-n-octyl-3(2H)-isothiazolone	64359-81-5	#####	3982	Microbiocide, Antifoulant	Isothiazolone
4-chloro-2-n-octyl-3(2H)-isothiazolone	64359-80-4	#####	NA 102	Microbiocide	Isothiazolone
5-chloro-2-((4-chlorophenyl)methyl)-3(2H)-isothiazolone, compd. With 2-((4-chlorophenyl)methyl)-3(2h)-isothiazolone (1:1)	83542-80-7	#####	NA 125	Microbiocide	Isothiazolone
5-chloro-2-(4-chlorophenylmethyl)-3(2H)-isothiazolone	66159-95-3	#####	NA 125	Microbiocide	Isothiazolone

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5-chloro-2-methyl-4-isothiazolin-3-one	26172-55-4	#####	2038	Microbiocide	Isothiazolone
5-chloro-2-methyl-4-isothiazolin-3-one calcium chloride with 2-methyl-4-isothiazolin-3-one calcium chloride	55965-87-2	#####	NA 896	Microbiocide	Isothiazolone
Kathon 886 (kathon biocide)	55965-84-9	#####	NA 24	Microbiocide	Isothiazolone
Othilnone	26530-20-1	99901	1881	Microbiocide, Fungicide	Isothiazolone
2,4,6-triisopropyl phenol	376389	NA 116	3492	N/A	Phenols
2,4-xylenol	105-67-9	86804	638	Solvent, Fungicide, Microbiocide	Phenols
2,6-bis (1-methyl heptadecyl)-p-cresol	5012-62-4	NA 106	3069	Microbiocide	Phenols
2-tert-Amylphenol	87-26-3	64119	NA 538	Microbiocide	Phenols
4-Hexylresorcinol	136-77-6	71403	NA 671	N/A	Phenols
4-Octylresorcinol	6565-70-4	71402	NA 670	N/A	Phenols
5-isopropyl-o-cresol	499-75-2	22104	1877	Microbiocide	Phenols
Butylated hydroxy toluene	128-37-0	22105	1309	Preservative	Phenols
Carbolic acid	108-95-2	64001	107	Microbiocide, Nematicide	Phenols
Coal tar phenols	1319-77-3	22101	1720	N/A	Petroleum derivative, Phenols
Cresol	1319-77-3	NA 219	NA 218	Insect Repellent, Microbiocide	Phenols
Diisobutyl cresoxy ethoxy ethyl dimethyl benzyl ammonium chloride- ortho-phenylphenol ethoxy nonyl phenol complex	53466-87-8	69155	1643	Microbiocide	Phenols
Diisopropyl cresol	31291-59-5	22107	NA 176	Microbiocide	Phenols
Diisopropyl phenols	NA 170	NA 329	3638	N/A	Phenols
Hydroxymercury cresol	12379-66-7	46001	NA 390	Microbiocide	Inorganic-Mercury, Heavy metal, Phenols
Isopropyl cresol	499-75-2	22104	1161	Microbiocide	Phenols
Isopropyl phenol	25168-06-3	NA 155	3256	Microbiocide	Phenols
Meta-cresol	108-39-4	22102	378	Microbiocide	Phenols
Nonyl phenol	25154-52-3	NA 44	3304	Adjuvant	Phenols
o-cresol	95-48-7	NA 374	3113	Microbiocide	Phenols
o-Phenylphenol, alkyl* amine - zinc salt of *(100% C18)	82010-74-0	64107	NA 533	Microbiocide	Phenols, Inorganic-Zinc
o-Phenylphenol, tetradecylamine salt	53404-71-0	64109	NA 534	Microbiocide	Phenols
Octylphenol	27193-28-8	64118	NA 537	N/A	Phenols
Ortho-phenylphenol	90-43-7	64103	448	Microbiocide	Phenols
Ortho-phenylphenol, ammonium salt	52704-98-0	64116	890	Microbiocide	Phenols
Ortho-phenylphenol, potassium salt	13707-65-8	64108	935	Microbiocide	Phenols
Ortho-phenylphenol, sodium salt	132-27-4	64104	248	Microbiocide	Phenols
p-cresol	106-44-5	NA 375	3114	Microbiocide	Phenols

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p-Cresyl acetate	140-39-6	NA 186	NA 186	Microbiocide	Phenols
Para-tert-amylphenol	80-46-6	64101	900	Microbiocide	Phenols
Para-tert-amylphenol, potassium salt	53404-18-5	64111	1056	Microbiocide	Phenols
Para-tert-butylphenol	98-54-4	64113	1000	Microbiocide	Phenols
Phenol, dodecyl-, mixed isomers	27193-86-8	NA 656	3323	N/A	Phenols
Phenol, ferrous salt	NA 686	NA 126	1862	N/A	Phenols
Phenols	64743-03-9	NA 189	NA 189	Microbiocide, Herbicide	Phenols
Polyvinylpyrrolidone-orthophenylphenol complex	53403-98-8	64110	NA 535	Microbiocide	Phenols
Propoxur phenol	4812-20-8	#####	NA 118	Breakdown product	Phenols
Resorcinol	108-46-3	71401	3375	N/A	Phenols
Sodium cresolate	34689-46-8	#####	NA 142	Microbiocide	Phenols
Sodium para-tert-amylphenate	31366-95-7	64112	1541	Microbiocide, Fungicide	Phenols
Sodium para-tert-butylphenate	5787-50-8	64115	1540	Microbiocide	Phenols
Sodium phenate	139-02-6	64002	2164	Microbiocide	Phenols
Thymol	89-83-8	80402	991	Dye	Phenols
Xylenol (unspec. Or mixed from 086804)	1300-71-6	86805	NA 837	N/A	Phenols
2-(2-(p-(diisobutyl) phenoxy) ethoxy) ethyl dimethyl ammonium chloride	121-54-0	69122	66	Microbiocide	Quaternary Ammonium Compound
2-(2-(p-(diisobutyl) phenoxy) ethoxy) ethyl dimethyl ammonium chloride	121-54-0	69164	NA 166	Microbiocide	Quaternary Ammonium Compound
3-(trimethoxysilyl) propyl dimethyl octadecyl ammonium chloride	27668-52-6	#####	2127	Microbiocide	Quaternary Ammonium Compound
3-alkoxy (C12-C15)-2-hydroxypropyl trimethyl ammonium chloride	68187-63-3	#####	2020	N/A	Quaternary Ammonium Compound
Acylamido alkylbenzyl dimethyl ammonium chloride	NA 993	NA 705	1442	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkenyl (90%C18, 10%C16) dimethyl ethyl ammonium bromide	NA 1313	NA 123	1243	Microbiocide, Adjuvant	Quaternary Ammonium Compound
Alkenyl* dimethyl ethyl ammonium bromide *(90%C18', 10%C16')	6458-13-5	69102	NA 620	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkenyl* dimethyl ethyl ammonium bromide *(90%C18', 10%C16')	NA 1187	69198	NA 167	Microbiocide	Quaternary Ammonium Compound
Alkyl (100%C14) dimethyl benzyl ammonium chloride	139-08-2	69107	2373	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (47%C12, 18%C14, 10%C18, 10%C16, 15%C8-C10) dimethylbenzyl ammonium chloride	NA 986	69143	1970	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (50%C12, 30%C14, 17%C16, 3%C18) dimethyl	8023-53-8	69110	2027	Algaecide, Microbiocide	Quaternary Ammonium



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dichlorobenzyl ammonium chloride					Compound
Alkyl (50%C12, 30%C14, 17%C16, 3%C18) dimethylbenzyl ammonium chloride	NA 987	69143	1850	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (50%C12, 30%C14, 17%C16, 3%C18) dimethylethylbenzyl ammonium chloride	8045-21-4	69111	1849	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (50%C14, 40%C12, 10%C16) dimethylbenzyl ammonium chloride	NA 988	69143	1846	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (50%C14, 40%C12, 10%C16) dimethylbenzyl ammonium saccharinate	68989-01-5	69171	324	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (53%C12, 19%C14, 8.5%C16, 7%C8, 6.5%C10, 6%C18) dimethyl benzylammonium chloride	61789-71-7	69140	3535	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (58%C14, 28%C16, 14%C12) dimethylbenzyl ammonium chloride	NA 989	69143	1912	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (58%C18, 40%C16, 1%C14, 1%C12) trimethyl ammonium chloride	68391-03-7	69163	2228	Microbiocide	Quaternary Ammonium Compound
Alkyl (60%C14, 25%C12, 15%C16) dimethylbenzyl ammonium chloride	68424-85-1	69105	1956	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (60%C14, 30%C16, 5%C12, 5%C18) dimethylbenzyl ammonium chloride	NA 976	69143	1847	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (61%C12, 23%C14, 11%C16, 3%C10, 2%C8) dimethylbenzyl ammonium chloride	68989-00-4	#####	1960	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (61%C12, 23%C14, 11%C16, 5%C18) dimethyl benzyl ammonium chloride	NA 977	69143	1975	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (61%C12, 23%C14, 11%C16, 5%C8, C10, C18) dimethylbenzyl ammonium chloride	NA 978	69143	2060	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (61%C12, 23%C14, 11%C16, 2.5%C8 & C10, 2.5%C18) dimethyl benzyl ammonium chloride	61789-71-7	69140	2375	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (65%C12, 25%C14, 10%C16) dimethylbenzyl ammonium chloride	NA 979	69143	1971	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (67%C12, 25%C14, 7%C16, 1%C8, C10, C18) dimethylbenzyl ammonium chloride	NA 980	69143	1853	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (68% C12, 32% C14)	NA 1190	#####	NA 167	Algaecide,	Quaternary

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dimethyl dimethylbenzyl ammonium chloride				Microbiocide	Ammonium Compound
Alkyl (68%C12, 32%C14) dimethylethylbenzyl ammonium chloride	85409-23-0	69154	1854	Algaecide, Fungicide, Microbiocide	Quaternary Ammonium Compound
Alkyl (70%C18, 27%C16, 3%C14) trimethyl ammonium chloride	68391-03-7	69163	10	Microbiocide	Quaternary Ammonium Compound
Alkyl (90%C14, 5%C12, 5%C16) dimethyl dichlorobenzyl ammonium chloride	8023-53-8	69110	1909	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (90%C14, 5%C12, 5%C16) dimethyl ethyl ammonium bromide	68527-84-4	69146	2057	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (90%C14, 5%C12, 5%C16) dimethylbenzyl ammonium chloride	NA 981	69143	1977	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (93%C14, 4%C12, 3%C16) dimethylbenzyl ammonium chloride	NA 1031	69143	1991	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (95%C14, 3%C12, 2%C16) dimethyl benzyl ammonium chloride	68424-85-1	69105	3855	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (95%C14, 3%C12, 2%C16) dimethyl benzyl ammonium chloride dihydrate	NA 982	69184	2152	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (95%C14, 3%C12, 2%C16) dimethyl benzyl ammonium chloride monohydrate	NA 1322	NA 583	3897	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (98%C12, 2%C14) dimethyl 1-naphthylmethyl ammonium chloride	53516-75-9	69112	1839	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (C10-16) dimethyl amine oxide	61788-90-7	NA 401	3896	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (C14, C12, C16) dimethyl benzyl ammonium chloride	NA 985	NA 587	2374	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl (C8-C18) bis (2-hydroxyethyl) benzyl ammonium chloride	61789-68-2	#####	2031	Microbiocide	Quaternary Ammonium Compound
Alkyl (C8-C18) bis (2-hydroxyethyl) benzyl ammonium chloride	NA 1196	69148	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl dimethyl cumenyl ammonium chloride	NA 983	NA 584	1919	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl dimethyl ethyl benzyl ammonium cyclohexyl sulfonate	NA 974	NA 580	1002	Microbiocide	Quaternary Ammonium Compound
Alkyl dimethyl ethylbenzyl ammonium cyclohexyl sulfamate	71808-54-3	69135	1722	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl dimethyl isopropyl benzyl ammonium chloride	NA 975	69188	884	Microbiocide	Quaternary Ammonium

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					Compound
Alkyl monoethoxyethanol, diethoxyethyl benzyl ammonium chloride	NA 305	NA 577	1045	Microbiocide	Quaternary Ammonium Compound
Alkyl morpholinium ethosulphate (1% C14, 22% C16, 77% C18)	NA 1523	NA 223	NA 223	Fungicide	Quaternary Ammonium Compound
Alkyl trimethyl ammonium bromides	68424-92-0	#####	1827	Microbiocide	Quaternary Ammonium Compound
Alkyl(68%C12, 32%C14)dimethyl dimethylbenzyl ammonium chloride	NA 1068	NA 159	5126	Algaecide	Quaternary Ammonium Compound
Alkyl* bis(2-hydroxyethyl)benzyl ammonium chloride *(57%C10, 20%C12, 11%C14, 9%C18, 2%C16, 1%C8)	91721-81-2	#####	NA 113	N/A	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(42% C12, 27% C14, 13% C16, 18% C8-C18)	NA 1197	#####	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(50%C14, 40%C12, 10%C16)	68989-02-6	#####	NA 112	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(55%C14, 23%C12, 20%C16, 2%C18)	92129-28-7	69182	NA 648	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(60% C14, 30% C16, 10% C12)	68989-02-6	#####	NA 124	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(60%C12, 25%C14, 15%C16)	68989-02-6	69180	NA 646	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(63% C12, 23% C14, 14% C16)	68989-02-6	#####	NA 113	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(65%C12, 22%C14, 10%C16, 3%C18)	92129-28-7	69196	NA 653	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(68% C12, 27% C14, 5%C16)	68989-02-6	#####	NA 114	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(75% C12, 25% C14)	68568-47-8	#####	NA 124	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(75% C12, 25% C14)	68989-02-6	#####	NA 124	Algaecide, Microbiocide	Quaternary Ammonium Compound

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Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(90%C14, 5%C16, 5%C12)	68989-02-6	69145	NA 635	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride *(C12 65%, C14 25%, C16 10%)	68989-02-6	#####	NA 115	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl 3,4-dichlorobenzyl ammonium chloride polyethoxypolypropoxypolyethoxyethanol - iodine complex *(50%C12, 30%C14, 1	NA 1198	46907	NA 168	Microbiocide, Microbiocide	Iodine Compound, Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium bentonite *(as in fatty acids of tallow)	71011-24-0	#####	NA 113	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(100% C16)	122-18-9	69108	NA 623	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(100% C18)	122-19-0	#####	NA 114	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(41%C14, 28%C12, 19%C18, 12%C16)	68391-01-5	69195	NA 652	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(47%C12, 18%C14, 15%(C5-C15), 10%C18, 10%C16)	NA 1199	69168	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(50%C12, 30%C14, 17%C16, 3%C18)	8001-54-5	69106	NA 622	Microbiocide, Algaecide, Herbicide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(55% C16, 27% C12, 16% C14, 2% C18)	68391-01-5	#####	NA 113	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(55%C16, 20%C14, 20%C12, 5%C18)	68391-01-5	69169	NA 641	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(58%C14, 28%C16, 14%C12)	NA 1200	69141	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(60% C14, 30% C16, 10% C12)	68424-85-1	69161	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(60%C14, 25%C12, 15%C16)	NA 1201	69137	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(60%C14, 30%C16, 5%C18, 5%C12)	53516-76-0	69104	NA 621	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl	68391-01-5	69189	NA 650	Algaecide,	Quaternary

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ammonium chloride *(61% C12, 23% C14, 11% C16, 5% C18)				Microbiocide	Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(61% C12, 23% C14, 11% C16, 5% C18)	NA 1202	#####	NA 168	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(65%C12, 23%C14, 12%C16)	NA 1203	69199	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(65%C12, 25%C14, 10%C16)	68424-85-1	69157	NA 164	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(67%C12, 25%C14, 7%C16, 1%C18)	68391-01-5	69175	NA 644	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(67%C12, 25%C14, 7%C16, 1%C8, C10, and C18)	NA 1204	#####	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(67%C12, 27%C14, 6%C16)	NA 1205	69142	NA 169	Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(68% C12, 25% C14, 7% C16)	NA 1206	#####	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(90%C14, 5%C12, 5%C16)	NA 1207	69194	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(93%C14, 4%C12, 3%C16)	68424-85-1	69158	NA 164	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(95% C16, 5% C18)	68607-20-5	#####	NA 114	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(as in fatty acids of coconut oil)	NA 1208	#####	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium chloride *(C8-18)	NA 1209	#####	NA 169	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl benzyl ammonium ion alkyl** amine *(C12, C14, C16) *(C10, C12, C14, C16)	61790-41-8	#####	NA 114	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl dimethylbenzyl ammonium chloride *(50%C12, 30%C14, 17%C16, 3%C18)	8045-22-5	69109	NA 624	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl ethyl ammonium bromide *(85% C16, 15% C18)	134595-54-3	69186	NA 649	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl ethyl ammonium bromide *(mixed alkyl and alkenyl groups as in fatty acids of soybean oil)	61788-99-6	#####	NA 113	Algaecide, Microbiocide	Quaternary Ammonium Compound

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Alkyl* dimethyl ethylbenzyl ammonium chloride *(60%C14, 30%C16, 5%C12, 5%C18)	68956-79-6	69167	NA 640	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* dimethyl ethylbenzyl ammonium cyclohexylsulfamate *(50%C12, 30%C14, 17%C16, 3%C18)	37335-68-5	69135	NA 633	Algaecide, Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium bromide *(95%C14, 5%C16)	1119-97-7	69153	NA 637	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *(70% C12, 30% C14)	112-00-5	#####	NA 113	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *(70%C18, 27%C16, 3%C14)	68002-63-1	69197	NA 654	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *(90%C18, 10%C16)	68002-62-0	69151	NA 636	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *(alkyl as in fatty acids of soybean oil)	61790-41-8	#####	NA 115	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *(as in fatty acids of coconut oil)	61789-18-2	#####	NA 109	Microbiocide	Quaternary Ammonium Compound
Alkyl* trimethyl ammonium chloride *derived from cottonseed oil	68002-61-9	69139	NA 634	Microbiocide	Quaternary Ammonium Compound
Alkyl*-5-hydroxy-4-oxo-2(4H)-pyranylmethyl dimethyl ammonium chloride *(49% C12, 17% C14, 17% C10, 10% C18, 9% C16, 8% C8)	NA 1189	#####	NA 167	Microbiocide	Quaternary Ammonium Compound
Alkyl*-N,N-bis(2-hydroxyethyl)methyl ammonium chloride *(53% C12, 19% C14, 8.5% C16, 7.0% C8, 6.5% C10, 6.0% C18)	70750-47-9	#####	NA 114	N/A	Quaternary Ammonium Compound
Alkyl*-N-ethyl morpholinium ethyl sulfate *(66%C18, 25%C16, 8%C18, 1%C14)	NA 1213	69147	NA 170	Fungicide, Algaecide	Quaternary Ammonium Compound
Alkyldimethylbenzyl ammonium chloride	NA 1368	NA 194	NA 193	Microbiocide, Herbicide	Quaternary Ammonium Compound
Alkyldimethylethylbenzyl ammonium chloride	NA 1369	NA 194	NA 193	Microbiocide, Herbicide	Quaternary Ammonium Compound
Alkyltrimethyl ammonium chloride	NA 1370	NA 194	NA 193	Microbiocide, Fungicide	Quaternary Ammonium Compound
Alkyltrimethylbenzyl ammonium chloride	NA 1371	NA 194	NA 193	Herbicide	Quaternary Ammonium Compound
Benzyl dimethyl octadecyl	122-19-0	#####	1186	Microbiocide	Quaternary

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ammonium chloride					Ammonium Compound
Benzyl((dodecylcarbamoyl)methyl)dimethyl ammonium chloride	100-95-8	69159	NA 638	Microbiocide	Quaternary Ammonium Compound
Benzyl-C12-14-alkyldimethyl quaternary ammonium compounds	134058-54-1	69192	5069	Microbiocide	Quaternary Ammonium Compound
Cetyl dimethyl ethyl ammonium bromide	124-03-8	69156	122	Microbiocide	Quaternary Ammonium Compound
Cetyl trimethyl ammonium bromide	57-09-0	69117	116	Microbiocide, Herbicide	Quaternary Ammonium Compound
Cetyl trimethyl ammonium chloride	112-02-7	69133	NA 632	Microbiocide	Quaternary Ammonium Compound
Cetylceide (95%C16, 3%C14, 2%C12)	124-03-8	69156	2061	Microbiocide	Quaternary Ammonium Compound
Chlormequat	7003-89-6	NA 216	NA 215	Plant Growth Regulator	Quaternary Ammonium Compound
Chlormequat chloride	999-81-5	18101	1512	Plant Growth Regulator	Quaternary Ammonium Compound
Di(alkyl* oxypropyl)dimethyl ammonium chloride *(60%C8, 40%C10)	NA 1261	69121	NA 173	Algaecide, Microbiocide	Quaternary Ammonium Compound
Dialkyl (85%C18, 15%C16) dimethyl ammonium chloride	68514-95-4	NA 355	197	Microbiocide, Adjuvant	Quaternary Ammonium Compound
Dialkyl dimethyl ammonium polynaphthyl amine	NA 900	NA 172	5181	Microbiocide	Quaternary Ammonium Compound
Dialkyl* dimethyl ammonium chloride *(47%C12, 18%C14, 10%C18, 9%C10, 8%C16, 8%C8)	73398-64-8	69136	2230	Microbiocide	Quaternary Ammonium Compound
Dialkyl* dimethyl ammonium chloride *(48% C12, 17% C14, 10% C18, 9% C16, 8% C8, 7% C10, 1% C6)	73398-64-8	#####	NA 114	Microbiocide	Quaternary Ammonium Compound
Dialkyl* dimethyl ammonium chloride *(50%C12, 20%C14, 15%C10, 10%C16, 5%C18)	68153-33-3	#####	NA 113	Microbiocide	Quaternary Ammonium Compound
Dialkyl* dimethyl ammonium chloride *(50%C12, 30%C14, 20%C16)	68910-56-5	69177	NA 645	Microbiocide	Quaternary Ammonium Compound
Dialkyl* dimethyl ammonium chloride *(70%C18, 26%C16, 4%C14)	68002-59-5	69120	NA 626	Microbiocide	Quaternary Ammonium Compound
Dialkyl* methyl benzyl ammonium chloride *(60% C14, 30% C16, 5% C18, 5% C12)	73049-75-9	69119	NA 625	Algaecide, Microbiocide	Quaternary Ammonium Compound
Diallyl dimethyl ammonium	26062-79-3	#####	5092	Adjuvant	Quaternary

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chloride polymers					Ammonium Compound
Dibenzyl dimethyl ammonium chloride	NA 1440	NA 213	NA 213	Microbiocide	Quaternary Ammonium Compound
Dicoco dimonium chloride	61789-77-3	69138	3140	Adjuvant	Quaternary Ammonium Compound
Didecyl dimethyl ammonium carbonate and didecyl dimethyl ammonium bicarbonate	148788-55-0	69208	NA 658	Microbiocide	Quaternary Ammonium Compound
Didecyl dimethyl ammonium carbonate and didecyl dimethyl ammonium bicarbonate	148812-65-1	69208	NA 659	Microbiocide	Quaternary Ammonium Compound
Didecyl dimethyl ammonium chloride	7173-51-5	69149	1682	Microbiocide, Fungicide	Quaternary Ammonium Compound
Didecyl methyl benzyl ammonium chloride	32426-10-1	69170	NA 642	Microbiocide	Quaternary Ammonium Compound
Dihydrogenated tallow dimethyl ammonium methosulfate	61789-81-9	69150	3153	Adjuvant	Quaternary Ammonium Compound
Dilauryl dimethyl ammonium bromide	3282-73-3	#####	NA 112	Microbiocide	Quaternary Ammonium Compound
Dimethyl dicoco ammonium chloride	NA 166	NA 317	1945	Microbiocide	Quaternary Ammonium Compound
Dimethyl dioctadecyl ammonium bentonite	NA 627	NA 114	3163	Adjuvant	Quaternary Ammonium Compound
Dioctyl dimethyl ammonium chloride	5538-94-3	69166	1710	Microbiocide, Algacide, Fungicide	Quaternary Ammonium Compound
Distearyl dimonium chloride	107-64-2	#####	3176	Adjuvant	Quaternary Ammonium Compound
Dodecyl di(2-hydroxyethyl) benzyl ammonium chloride	19379-90-9	69181	NA 647	Microbiocide	Quaternary Ammonium Compound
Dodecyl dimethyl 2,4,5-trimethylbenzyl ammonium chloride	53404-46-9	#####	NA 113	Microbiocide	Quaternary Ammonium Compound
Dodecyl dimethyl ammonium chloride	NA 157	NA 294	1008	Microbiocide	Quaternary Ammonium Compound
Dodecyl dimethyl benzyl ammonium bromide	1964001	69123	NA 627	Fungicide, Microbiocide	Quaternary Ammonium Compound
Dodecyl dimethyl benzyl ammonium chloride	139-07-1	69124	1167	Microbiocide, Herbicide	Quaternary Ammonium Compound
Dodecyl dimethyl benzyl ammonium cyclopentanecarboxylate	22232-26-4	69128	NA 629	Microbiocide	Quaternary Ammonium Compound
Dodecyl dimethyl benzyl	NA 1027	69127	1446	Fungicide,	Quaternary



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ammonium naphthenate				Insecticide, Fungicide	Ammonium Compound
Dodecyl dimethyl trichlorobenzyl ammonium chloride	53466-90-3	#####	NA 113	Microbiocide	Quaternary Ammonium Compound
Dodecylbenzyl alkyl (70%C12, 30%C14) dimethyl ammonium chloride	87175-02-8	#####	1038	Algacide, Microbiocide	Quaternary Ammonium Compound
Dodecylbenzyl octadecyl dimethyl ammonium chloride	29932-85-2	#####	NA 113	Microbiocide	Quaternary Ammonium Compound
Dodecylbenzyl trimethyl ammonium 2-ethylhexanoate	12379-51-0	69126	NA 628	N/A	Quaternary Ammonium Compound
Dodecylbenzyl trimethyl ammonium chloride	1330-85-4	69125	918	Adjuvant, Microbiocide	Quaternary Ammonium Compound
Ecolyst	NA 1174	69089	NA 165	Plant Growth Regulator	Quaternary Ammonium Compound
Ethyl dimethyl stearyl ammonium bromide	111-98-8	#####	NA 115	Microbiocide	Quaternary Ammonium Compound
Mepiquat	15302-91-7	NA 203	NA 202	Plant Growth Regulator	Quaternary Ammonium Compound
Mepiquat chloride	24307-26-4	#####	2075	Plant Growth Regulator	Quaternary Ammonium Compound
Methyl dodecyl benzyl trimethyl ammonium chloride	1399-80-0	69129	895	Microbiocide	Quaternary Ammonium Compound
Methyl dodecyl benzyl trimethyl ammonium chloride 80% and methyl	NA 619	NA 112	2678	Microbiocide	Quaternary Ammonium Compound
Methyl dodecyl trimethyl ammonium chloride	NA 44	NA 83	2679	Microbiocide	Quaternary Ammonium Compound
Methyl dodecyl xylene bis (trimethyl ammonium chloride)	NA 45	NA 84	896	Microbiocide	Quaternary Ammonium Compound
Methyl trioctyl ammonium chloride	5137-55-3	NA 72	3291	Adjuvant	Quaternary Ammonium Compound
Morpholine dodecyl benzene sulfonate	12068-08-5	#####	3294	Microbiocide, Adjuvant, Fungicide, Insecticide	Quaternary Ammonium Compound
N-(3,4-dichlorobenzyl)-N-dodecyl-N,N-dimethyl ammonium chloride	102-30-7	#####	1129	Microbiocide	Quaternary Ammonium Compound
N-alkyl (92%C18, 8%C16)-N-ethyl morpholinium ethyl sulfate	61791-34-2	69113	986	Fungicide, Microbiocide	Quaternary Ammonium Compound
N-alkyl (soza)-N-methyl morpholinium sulfate	NA 281	NA 550	3020	Fungicide, Microbiocide	Quaternary Ammonium Compound

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N-cetyl-N-ethyl morpholinium ethyl sulfate	78-21-7	69113	1792	Fungicide, Microbiocide	Quaternary Ammonium Compound
N-Cetyl-N-ethyl morpholinium ethyl sulfate	78-21-7	#####	NA 174	Fungicide	Quaternary Ammonium Compound
N-Cetyl-N-ethylmorpholinium ethyl sulfate	78-21-7	69187	NA 172	Fungicide	Quaternary Ammonium Compound
N-Dialkyl (60%C14, 30%C16, 5%C12, 5%C18) methyl benzyl ammonium chloride	68424-87-3	NA 356	2070	Microbiocide	Quaternary Ammonium Compound
N-isononyl-N,N-dimethyl decanaminium chloride	138698-36-9	69207	5070	Microbiocide	Quaternary Ammonium Compound
Octyl decyl dimethyl ammonium chloride	32426-11-2	69165	1709	Microbiocide, Fungicide	Quaternary Ammonium Compound
Octyl dodecyl dimethyl ammonium chloride	10361-16-7	69190	1947	Microbiocide	Quaternary Ammonium Compound
Oleyl dimethyl ethyl ammonium bromide	14351-44-1	69132	NA 631	Microbiocide	Quaternary Ammonium Compound
Oxydiethylene bis (alkyl dimethyl ammonium chloride), alkyl derived from coconut oil fatty acids	68607-28-3	69173	1362	Microbiocide	Quaternary Ammonium Compound
Polybromide form of trimethylbenzyl ammonium resin	NA 1164	8711	NA 163	Microbiocide	Quaternary Ammonium Compound
Polyethoxypolypropoxypolyethoxyethanol-n-alkyl (54% C12, 18% C14, 9% C16, 9% C18, 5% C10, 5% C8) di(beta-hydroxyethyl) benzyl am	NA 1287	46913	NA 175	Microbiocide	Iodine Compound, Quaternary Ammonium Compound
Polymeric quaternary ammonium chloride	NA 1463	NA 217	NA 216	Microbiocide, Adjuvant	Quaternary Ammonium Compound
Polyquaternium-6	28301-34-0	NA 767	2818	Adjuvant	Quaternary Ammonium Compound
Polytrimethyl vinyl benzyl ammonium chloride	9017-80-5	NA 119	3769	Adjuvant	Quaternary Ammonium Compound
Quaternium-18 bentonite	68953-58-2	#####	2996	Adjuvant	Quaternary Ammonium Compound
Soya ethyl morpholinium ethosulfate	61791-34-2	69113	3453	Fungicide, Microbiocide	Quaternary Ammonium Compound
Tetradecyl dimethyl benzyl ammonium chloride	139-08-2	69107	1166	Algaecide, Microbiocide	Quaternary Ammonium Compound
Tetraethyl ammonium hydroxide	77-98-5	4215	NA 76	N/A	Quaternary Ammonium Compound

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2-Mercaptobenzothiazole, zinc salt	155-04-4	51705	1449	Fungicide, Microbiocide	Mercaptobenzothiazole, Inorganic-Zinc
5-Chloro-2-mercaptobenzothiazole, zinc salt	53404-93-6	51709	NA 427	Microbiocide, Fungicide	Mercaptobenzothiazole, Inorganic-Zinc
Acetic acid, copper (2+) salt	142-71-2	NA 697	3013	N/A	Inorganic-Copper
Alkyl*-1-(2-aminoethyl)-2-imidazoline acetate - nickel sulfate complex	NA 1188	46606	NA 167	Microbiocide	Inorganic-Nickel, Imidazoline
Aluminum	7429-90-5	111	1042	N/A	Inorganic
Aluminum acetate	NA 971	NA 548	3025	N/A	Inorganic
Aluminum bicarbonate	NA 1043	NA 140	3026	N/A	Inorganic
Aluminum caprylate	6028-57-5	NA 549	3027	N/A	Inorganic
Aluminum chloride	7446-70-0	13901	3028	N/A	Inorganic
Aluminum diacetate	142-03-0	NA 113	3029	N/A	Inorganic
Aluminum hydroxide	21645-51-2	NA 129	2145	N/A	Inorganic
Aluminum magnesium silicate	NA 1018	NA 107	2378	Adjuvant	Inorganic
Aluminum oxide	1344-28-1	NA 540	3030	N/A	Inorganic
Aluminum phosphide	20859-73-8	66501	484	Fumigant, Fungicide, Fungicide	Inorganic
Aluminum potassium sulfate	10043-67-1	#####	3031	Herbicide, Insecticide	Inorganic
Aluminum silicate	1302-76-7	NA 131	2379	Adjuvant	Inorganic
Aluminum stearate	637-12-7	NA 541	3032	N/A	Inorganic
Aluminum sulfate	10043-01-3	13906	1415	Plant Growth Regulator, Molluscicide	Inorganic
Ammonia	7664-41-7	5302	22	Insecticide, Deer Repellent, Fungicide	Inorganic
Ammonium alum	7784-26-1	NA 533	3037	Repellent	Inorganic
Ammonium alum	NA 1216	98501	NA 170	Adjuvant	Inorganic
Ammonium arsenate	7784-44-3	13601	2380	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Ammonium bicarbonate	1066-33-7	NA 534	3038	pH Adjustment	Inorganic
Ammonium bisulfate	7803-63-6	NA 141	3039	N/A	Inorganic
Ammonium bromide	12124-97-9	352	3040	N/A	Inorganic
Ammonium carbamate	1111-89-7	NA 141	3041	N/A	Inorganic
Ammonium carbonate	506-87-6	73501	3042	Fungicide, Herbicide, Microbiocide, pH Adjustment	Inorganic
Ammonium chloride	12125-02-9	#####	3043	N/A	Inorganic
Ammonium dichromate	2149701	68305	NA 607	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Ammonium ferric sulfate	10138-04-2	NA 537	3047	Herbicide	Inorganic
Ammonium fluosilicate	16919-19-0	75301	695	Insecticide	Inorganic
Ammonium fluosilicate on silica gel	62449-69-8	75311	NA 694	Insecticide	Inorganic
Ammonium hydroxide	1336-21-6	5301	2381	Fungicide, pH Adjustment, Herbicide,	Inorganic

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				Microbiocide	
Ammonium nitrate	6484-52-2	76101	3052	Rodenticide, Microbiocide	Inorganic
Ammonium nitrite	13446-48-5	76201	NA 700	Rodenticide, Microbiocide	Inorganic
Ammonium oxalate	1113-38-8	9603	891	Microbiocide	Inorganic
Ammonium polysulfides	9080-17-5	76701	NA 707	Insecticide, Fungicide	Inorganic
Ammonium sulfate	7783-20-2	5601	1363	Herbicide, pH Adjustment	Inorganic
Ammonium thiocyanate	1762-95-4	68200	25	Synergist	Inorganic
Ammonium thiosulfate	7783-18-8	80103	892	Insecticide, Fungicide, Herbicide	Inorganic
Anhydrous zirconium (IV) oxide	1314-23-4	79090	2204	N/A	Inorganic
Anilinocadmium dilactate	19651-91-3	64601	NA 548	N/A	Inorganic-Cadmium, Heavy metal
Arsenic	7440-38-2	NA 121	710	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic acid	7778-39-4	6801	40	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic disulfide	56320-22-0	6901	NA 98	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic pentoxide	1303-28-2	6802	631	Fungicide, Insecticide, Rodenticide, Herbicide	Inorganic-arsenic, Heavy metal
Arsenic sulfide	12612-21-4	6901	NA 99	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trioxide	1327-53-3	7001	42	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trisulfide	1303-33-9	6901	NA 97	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsonic acid, ammonium salt	58829-95-1	#####	NA 105	Herbicide, Insecticide, Wood Preservative	Inorganic-arsenic, Heavy metal
Asbestos	1332-21-4	99301	2398	Insecticide	Inorganic
Barium carbonate	513-77-9	7501	3060	N/A	Inorganic
Barium chloride	10361-37-2	NA 141	3061	N/A	Inorganic
Barium fluosilicate	17125-80-3	75302	NA 688	Insecticide	Inorganic
Barium metaborate	13701-59-2	11101	973	Fungicide	Inorganic
Barium nitrate	10022-31-8	NA 186	NA 185	Repellent	Inorganic
Barium polysulfide	50864-67-0	76704	NA 709	Insecticide, Fungicide	Inorganic
Barium sulfate	7727-43-7	7502	2411	N/A	Inorganic
Basic copper arsenate	16102-92-4	#####	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Basic lead silicate	53466-66-3	48003	NA 417	N/A	Inorganic-Lead, Heavy metal
Bentonite	1302-78-9	NA 496	1399	Adjuvant	Inorganic
Blast furnace slag	NA 239	NA 477	2425	N/A	Inorganic
Borax	1303-96-4	11102	79	Insecticide, Herbicide	Inorganic
Bordeaux mixture	NA 240	NA 478	80	Fungicide	Inorganic-Copper
Boric acid	10043-35-3	11001	769	Insecticide	Inorganic
Boric acid(H4B6O11), zinc salt(1:2)	12447-61-9	#####	5094	Fungicide	Inorganic-Zinc
Boric oxide	1303-86-2	11002	2090	Insecticide	Inorganic
Boron	7440-42-8	#####	2426	N/A	Inorganic
Boron sodium oxide (B4Na2O7), pentahydrate	12179-04-3	11110	NA 116	Insecticide	Inorganic
Bromine	7726-95-6	8701	2296	Microbiocide	Inorganic
Bromine chloride	13863-41-7	20504	2323	Microbiocide	Inorganic
Cadmium	7440-43-9	NA 460	2438	N/A	Inorganic-Cadmium, Heavy metal
Cadmium carbonate	513-78-0	12901	93	N/A	Inorganic-Cadmium, Heavy metal
Cadmium chloride	10108-64-2	12902	94	N/A	Inorganic-Cadmium, Heavy metal
Cadmium cocoate	72869-63-7	NA 459	3085	N/A	Inorganic-Cadmium, Heavy metal
Cadmium oxide	1306-19-0	#####	NA 130	N/A	Inorganic-Cadmium, Heavy metal
Cadmium perborate	NA 969	NA 461	3086	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sebacate	939499	12903	699	N/A	Inorganic-Cadmium, Heavy metal
Cadmium succinate	141-00-4	12904	92	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sulfate	10124-36-4	12905	NA 123	N/A	Inorganic-Cadmium, Heavy metal
Cadmium yellow pigments	NA 967	NA 448	2439	N/A	Inorganic-Cadmium, Heavy metal
Calcareous shale	NA 230	NA 449	3595	N/A	Inorganic
Calcium arsenate	7778-44-1	13501	96	Herbicide, Insecticide, Rodenticide, Molluscicide	Inorganic-arsenic, Heavy metal
Calcium arsenite	53404-59-4	13602	NA 129	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Calcium carbide	75-20-7	NA 450	1571	Repellent	Inorganic
Calcium carbonate	471-34-1	73502	1007	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Calcium carbonate, treated	NA 968	NA 451	2440	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Calcium chlorate	10137-74-3	73302	NA 682	Defoliant, Herbicide, Microbiocide	Inorganic

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Calcium chloride	10043-52-4	75605	920	Fungicide, Herbicide, Insecticide, Microbiocide, Molluscicide, Dessicant, Plant Growth Regulator	Inorganic
Calcium cyanide	592-01-8	74001	176	Rodenticide	Inorganic
Calcium hydroxide	1305-62-0	75601	99	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Calcium hypochlorite	7778-54-3	14701	326	Algaecide, Water Treatment	Inorganic
Calcium nitrite	13780-06-8	76202	NA 701	Rodenticide, Microbiocide	Inorganic
Calcium phosphate	10103-46-5	NA 195	NA 195	Rodenticide	Inorganic
Calcium phosphate, tribasic	7758-87-4	76401	1607	Rodenticide, Fungicide, Herbicide, Microbiocide	Inorganic
Calcium silicate	10101-39-0	72607	1908	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Calcium sulfate	7778-18-9	5602	2442	Insecticide, Herbicide	Inorganic
Calcium sulfate dihydrate	10101-41-4	203	NA 163	Insecticide, Herbicide	Inorganic
Calcium thiosulfate	10124-41-1	80101	930	Insecticide, Fungicide, Herbicide	Inorganic
Calcium-zinc LN 193 (complex)	NA 653	NA 120	3871	N/A	Inorganic-Zinc
Calomel	10112-91-1	52201	100	Fungicide	Inorganic-Mercury, Heavy metal
Carbon	7440-44-0	16001	712	Water Treatment, Rodenticide	Inorganic
Carbon black pigment	1333-86-4	NA 442	2445	Dye	Inorganic
Carbon dioxide	124-38-9	16601	2207	Fumigant, Insecticide, Rodenticide	Inorganic
Carbon disulfide	75-15-0	16401	108	Fumigant, Solvent, Breakdown product, Nematicide	Inorganic
Chlorinated trisodium phosphate (prior TSP & sodium hypochlorite)	56802-99-4	#####	2214	Water Treatment	Inorganic
Chlorine	7782-50-5	20501	131	Microbiocide, Water Treatment	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Chlorine dioxide	10049-04-4	20503	2053	Microbiocide, Water Treatment	Inorganic
Chlorophyllin	11006-34-1	NA 191	NA 190	Fungicide, Microbiocide	Inorganic-Copper, Botanical
Chromated zinc chloride	NA 1026	87801	1187	Insecticide, Herbicide, Microbiocide	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Chromic acetate	1066-30-4	21102	NA 172	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic acid	7738-94-5	21101	1188	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic oxide	1308-38-9	21103	NA 173	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromium dioxide	12018-01-8	NA 411	2470	N/A	Inorganic
Cobaltous sulfate	10124-43-3	NA 114	3110	N/A	Inorganic
Copper	7440-50-8	22501	714	Fungicide	Inorganic-Copper
Copper (from triethanolamine complex)	82027-59-6	24403	NA 198	Algaecide	Inorganic-Copper
Copper 2-ethylhexanoate	22221-10-9	41201	2235	Fungicide	Inorganic-Copper
Copper 3-phenylsalicylate	1250682	23801	NA 191	N/A	Inorganic-Copper
Copper 8-quinolinoleate	10380-28-6	24002	159	Fungicide, Microbiocide	Inorganic-Copper
Copper abietate	10248-55-2	23301	NA 184	Fungicide	Inorganic-Copper
Copper acetate	831632	44002	147	Fungicide	Inorganic-Copper
Copper ammonium acetate	NA 1544	NA 225	NA 225	Fungicide	Inorganic-Copper
Copper ammonium carbonate	33113-08-5	22703	1762	Fungicide	Inorganic-Copper
Copper ammonium complex	16828-95-8	22702	3550	Fungicide	Inorganic-Copper
Copper arsenate	10103-61-4	22801	NA 178	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper arsenite	10290-12-7	22401	NA 177	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper as elemental from copper - etidronic acid complex	50376-91-5	24404	NA 199	N/A	Inorganic-Copper
Copper beta cyclodextrin hydroxide	NA 1366	NA 193	NA 193	Fungicide	Inorganic-Copper
Copper bronze powder	7440-50-8	22501	1457	Antifoulant	Inorganic-Copper
Copper carbonate, basic	1184-64-1	22901	60	Fungicide, Algaecide, Insecticide	Inorganic-Copper
Copper chloride (anhydrous)	1344-67-8	23802	NA 192	N/A	Inorganic-Copper
Copper chloride (dihydrate)	10125-13-0	23701	NA 190	N/A	Inorganic-Copper
Copper citrate	10402-15-0	44005	1406	N/A	Inorganic-Copper
Copper citrate chelate	NA 961	NA 387	3547	N/A	Inorganic-Copper
Copper complex with ammonia and ethylene diamine tetraacetate	67989-88-2	#####	NA 130	Fungicide	Inorganic-Copper
Copper cresylate	12379-42-9	23001	NA 181	Fungicide	Inorganic-Copper
Copper	53404-24-3	41202	NA 349	N/A	Inorganic-Copper

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
dehydroabietylammmonium 2-ethylhexanoate					
Copper dihydrazinium sulfate	33271-65-7	50504	753	N/A	Inorganic-Copper
Copper ethanolamine complex	14215-52-2	24409	NA 201	Algaecide	Inorganic-Copper
Copper ethanolamine complexes, mixed	NA 1044	NA 146	3551	Algaecide	Inorganic-Copper
Copper ethylenediamine complex	13426-91-0	24407	3549	Herbicide	Inorganic-Copper
Copper gluconate chelate	814-91-5	23305	3548	N/A	Inorganic-Copper
Copper hydrazinium sulfate	53433-02-6	50501	NA 418	Fungicide	Inorganic-Copper
Copper hydroxide	20427-59-2	23401	151	Fungicide, Microbiocide, Nematicide	Inorganic-Copper
Copper hydroxide - triethanolamine complex	NA 1017	NA 105	1826	N/A	Inorganic-Copper
Copper isodecanoate	84082-88-2	41221	NA 354	N/A	Inorganic-Copper
Copper isononanoate	72915-82-3	41211	NA 352	N/A	Inorganic-Copper
Copper isooctanoate	88859-94-3	41204	NA 350	N/A	Inorganic-Copper
Copper lactate	16039-52-4	23302	NA 185	N/A	Inorganic-Copper
Copper linoleate	7721-15-5	23303	1110	N/A	Inorganic-Copper
Copper metaborate	39290-85-2	22802	NA 179	N/A	Inorganic-Copper
Copper monoethanolamine complex	NA 960	NA 384	3552	N/A	Inorganic-Copper
Copper naphthenate	1338-02-9	23102	153	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper naphthenate	1338-02-9	6000	NA 172	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper naphthenate	1338-02-9	6300	NA 172	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper nitroacetate	22221-12-1	23201	NA 183	N/A	Inorganic-Copper
Copper octanoate	20543-04-8	23306	5225	Fungicide	Inorganic-Copper
Copper oleate	10402-16-1	23304	154	Fungicide	Inorganic-Copper
Copper oxide (ic)	1317-38-0	42401	2231	Fungicide, Insecticide	Inorganic-Copper
Copper oxide (ous)	1317-39-1	25601	175	Fungicide, Insecticide	Inorganic-Copper
Copper oxychloride	1332-40-7	8001	156	Fungicide	Inorganic-Copper
Copper oxychloride (Cu <sub>2</sub> Cl(OH) <sub>3</sub> )	1332-65-6	23501	NA 186	Fungicide	Inorganic-Copper
Copper oxychloride sulfate	8012-69-9	23503	158	Fungicide	Inorganic-Copper
Copper oxysulfate	12158-97-3	23504	NA 188	N/A	Inorganic-Copper
Copper oxysulfate	82010-79-5	23504	NA 189	N/A	Inorganic-Copper
Copper pentachlorophenate	15773-35-0	63011	NA 512	Wood	Chlorinated Phenol,



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Preservative, Microbiocide, Algaecide, Fungicide	Inorganic-Copper
Copper phosphate	10103-48-7	22902	NA 180	N/A	Inorganic-Copper
Copper phthalocyanine	147-14-8	NA 381	2479	Dye	Inorganic-Copper
Copper pyrophosphate	10102-90-6	69701	NA 663	N/A	Inorganic-Copper
Copper salts of fatty and rosin acids	9007-39-0	23104	155	Fungicide	Inorganic-Copper
Copper salts of the acids of tall oil	61789-22-8	23103	NA 182	N/A	Inorganic-Copper
Copper silicate	1344-72-5	24301	NA 197	N/A	Inorganic-Copper
Copper sodium sulfate-phosphate complex	NA 1023	NA 121	755	N/A	Inorganic-Copper
Copper sulfate (anhydrous)	7758-98-7	24408	1778	Fungicide, Algaecide, Molluscicide	Inorganic-Copper
Copper sulfate (basic)	1344-73-6	8101	162	Fungicide, Algaecide, Molluscicide	Inorganic-Copper
Copper sulfate (pentahydrate)	7758-99-8	24401	161	Algaecide, Fungicide, Insecticide, Water Treatment, Molluscicide, Nematicide	Inorganic-Copper
Copper sulfate ethylene diamine	NA 1036	NA 132	2480	N/A	Inorganic-Copper
Copper sulfate, monohydrate	10257-54-2	24402	1789	Fungicide, Algaecide, Molluscicide	Inorganic-Copper
Copper sulfate, tri-basic	NA 1384	NA 195	NA 194	Herbicide, Algaecide, Fungicide, Water Treatment	Inorganic-Copper
Copper triethanolamine complex	68027-59-6	NA 125	1615	Algaecide	Inorganic-Copper
Copper-zinc chromate complex	1344-74-7	21003	163	Fungicide, Wood Preservative	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal, Inorganic-Copper
Copper-zinc sulfate complex	55072-57-6	8102	164	Fungicide	Inorganic-Zinc, Inorganic-Copper
Copper-zinc sulfate complex, monohydrate	NA 959	NA 382	1751	Fungicide	Inorganic-Zinc, Inorganic-Copper
Crag turf fungicide 531 (Cd-Cu-Ca-Zn-Chromate)	12001-20-6	21006	NA 171	Fungicide	Inorganic-Cadmium, Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Cryolite	15096-52-3	75101	173	Insecticide	Inorganic
Cuprammonium	NA 1382	NA 195	NA 194	Fungicide	Inorganic-Copper
Cupric acetoarsenite	12002-03-8	22601	2485	Wood	Inorganic-arsenic,

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
				Preservative	Heavy metal, Inorganic-Copper
Cupric ferric subsulfate complex	12168-20-6	42402	NA 365	Molluscicide	Inorganic-Copper
Cupric fluosilicate	12062-24-7	75309	NA 692	Insecticide	Inorganic-Copper
Cupric gluconate	527-09-3	24405	3117	Fungicide	Inorganic-Copper
Cupric nitrate	3251-23-8	76102	3118	N/A	Inorganic-Copper
Cuprous and cupric oxide, mixed	82010-82-0	42403	NA 366	N/A	Inorganic-Copper
Cuprous chloride (Cu <sub>2</sub> Cl <sub>2</sub> )	7758-89-6	#####	5597	Fungicide	Inorganic-Copper
Cuprous iodide	7681-65-4	#####	NA 902	N/A	Inorganic-Copper
Cuprous sulfide	22205-45-4	#####	NA 124	N/A	Inorganic-Copper
Cuprous thiocyanate	1111-67-7	25602	2108	Microbiocide	Inorganic-Copper
Device (swimming pool algaecide, copper generating) no guarantee required	NA 1504	NA 222	NA 222	Algaecide	Inorganic-Copper
Device (swimming pool algaecide, peroxide) no guarantee required	NA 1505	NA 222	NA 222	Algaecide	Inorganic
Device (swimming pool algaecide, salt in pool) no guarantee required	NA 1506	NA 222	NA 222	Algaecide	Inorganic
Di-potassium salts of phosphorous acid	13492-26-7	76416	NA 704	Fungicide, Microbiocide	Inorganic
Diammonium phosphate	7783-28-0	NA 819	654	Insecticide, Fungicide, Herbicide, Microbiocide, pH Adjustment	Inorganic
Diatomaceous earth	7631-86-9	72605	195	Insecticide, Molluscicide	Inorganic
Diatomaceous earth, other related	NA 1155	NA 173	90195	Insecticide, Molluscicide	Inorganic
Dihydrogen {ethylenediaminetetraacetato(4-)}cuprate(2-)	54453-03-1	24406	NA 200	N/A	Inorganic-Copper
Disodium EDTA-copper	14025-15-1	NA 296	3173	N/A	Inorganic-Copper
Disodium mono ethanolamine phosphate	53404-45-8	76410	1608	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Disodium octaborate anhydrous	12008-41-2	11107	5053	Insecticide	Inorganic
Disodium octaborate tetrahydrate	12280-03-4	11103	1800	Insecticide, Herbicide	Inorganic
Disodium phosphate	7558-79-4	76403	2534	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
EDTA diammonium copper salt	7379-26-2	39117	1613	Algaecide	Inorganic-Copper
EDTA, copper complex	12276-01-6	39105	1135	Algaecide	Inorganic-Copper
EDTA, disodium zinc salt	14025-21-9	NA 274	3189	N/A	Inorganic-Zinc
Fatty acid* - silver complex *(100% C8)	24927-67-1	72505	NA 675	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Feldspar	68476-25-5	NA 118	3656	N/A	Inorganic
Ferric chloride	7705-08-0	34901	3205	Herbicide	Inorganic
Ferric oxide	1332-37-2	NA 104	3206	N/A	Inorganic
Ferric sulfate (anhydrous)	10028-22-5	34902	1811	Herbicide	Inorganic
Ferrous ammonium sulfate	10045-89-3	50506	1307	Herbicide	Inorganic
Ferrous ammonium sulfate hexahydrate	7783-85-9	50509	NA 421	Herbicide	Inorganic
Ferrous sulfate	7720-78-7	NA 120	289	Herbicide, Molluscicide	Inorganic
Ferrous sulfate (monohydrate)	17375-41-6	50507	1812	Herbicide, Defoliant	Inorganic
Ferrous sulfate heptahydrate	7782-63-0	50502	1687	Herbicide	Inorganic
Granite	NA 105	NA 209	3663	N/A	Inorganic
Graphite	7782-42-5	NA 210	3217	N/A	Inorganic
Hydrated lime	1302-62-0	NA 194	3669	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Hydriodic acid	10034-85-2	46912	NA 408	N/A	Inorganic
Hydrocyanic acid	74-90-8	45801	NA 388	Fumigant	Inorganic
Hydrofluoric acid	7664-39-3	45601	NA 387	N/A	Inorganic
Hydrogen chloride	7647-01-0	45901	329	Fumigant, Fungicide, Nematicide, pH Adjustment, Herbicide	Inorganic
Hydrogen peroxide	7722-84-1	595	1794	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Hydrogen sulfide	2147416	NA 227	NA 227	Breakdown product	Inorganic
Hydrophosphorous acid	NA 95	NA 189	2600	N/A	Inorganic
Hydroxymercury cresol	12379-66-7	46001	NA 390	Microbiocide	Inorganic-Mercury, Heavy metal, Phenols
Hypochlorous acid	7790-92-3	#####	NA 110	Water Treatment, Microbiocide, pH Adjustment	Inorganic
Hypoiodous acid	14332-21-9	#####	NA 153	N/A	Inorganic
Inorganic phosphate	NA 940	NA 169	3671	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Iodic acid	7782-68-5	46902	NA 405	N/A	Inorganic
Iodine	7553-56-2	46905	718	Microbiocide, Fungicide, Herbicide	Inorganic
Iron	7439-89-6	NA 121	655	N/A	Inorganic
Iron oxide (Fe <sub>2</sub> O <sub>3</sub> )	1309-37-1	#####	NA 870	Herbicide	Inorganic
Iron oxide pigment	NA 942	NA 175	2618	Dye	Inorganic
Iron phosphate	10045-86-0	34903	5014	Molluscicide	Inorganic
Kaolin	1332-58-7	#####	2629	Insecticide, Adjuvant, Fungicide,	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Microbiocide	
Lauric acid, barium cadmium salt	15337-60-7	NA 118	3676	Adjuvant	Inorganic-Cadmium, Heavy metal
Lead	7439-92-1	NA 134	2638	N/A	Inorganic-Lead, Heavy metal
Lead acetate	301-04-2	48001	NA 415	N/A	Inorganic-Lead, Heavy metal
Lead arsenate	7784-40-9	13503	353	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead arsenate, basic	1327-31-7	13502	354	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead metasilicate	NA 938	NA 138	1106	N/A	Inorganic-Lead, Heavy metal
Lead monoxide	10190-55-3	NA 123	1271	N/A	Inorganic-Lead, Heavy metal
Lead naphthenate	61790-14-5	48004	3296	N/A	Inorganic-Lead, Heavy metal
Lignin sulfonic acid, copper salt	NA 933	NA 126	1925	N/A	Inorganic-Copper
Lignin sulfonic acid, zinc salt	NA 1014	NA 102	1768	N/A	Inorganic-Zinc
Lignin sulfonic acid, zinc, manganese & iron salts	NA 1030	NA 126	1771	N/A	Inorganic-Zinc
Lime	1305-78-8	75604	977	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Lime phosphate	NA 1432	NA 200	NA 199	Plant Growth Regulator	Inorganic
Lime-sulfur	1344-81-6	76702	358	Insecticide, Fungicide	Inorganic
Litharge	1317-36-8	48002	NA 416	N/A	Inorganic-Lead, Heavy metal
Lithium carbonate	554-13-2	NA 119	3924	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Lithium chloride	7447-41-8	#####	5318	N/A	Inorganic
Lithium hydroxide	1310-65-2	NA 143	3267	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Lithium hypochlorite	13840-33-0	14702	922	Microbiocide, Water Treatment	Inorganic
Lithium perchlorate	2150251	NA 115	3268	N/A	Inorganic
Magnesium aluminum fluosilicate	1327-43-1	75310	NA 693	Insecticide	Inorganic
Magnesium arsenate	10103-50-1	13504	NA 126	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Magnesium carbonate	546-93-0	73503	2654	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Magnesium chlorate	10326-21-3	#####	NA 155	Defoliant, Herbicide, Microbiocide	Inorganic
Magnesium chloride	7786-30-3	13902	365	Molluscicide, Herbicide, Insecticide, Microbiocide	Inorganic
Magnesium chloride, hexahydrate	7791-18-6	NA 110	2655	Molluscicide, Herbicide, Insecticide, Microbiocide	Inorganic
Magnesium fluosilicate	16949-65-8	75304	NA 689	Insecticide	Inorganic
Magnesium lime	NA 931	NA 111	3679	N/A	Inorganic
Magnesium nitrate	10377-60-3	NA 115	3269	Rodenticide, Microbiocide	Inorganic
Magnesium oxide	1309-48-4	9235	2656	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Magnesium phosphide	12057-74-8	66504	2085	Fumigant, Rodenticide	Inorganic
Magnesium silicate	1343-88-0	72601	NA 680	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Magnesium silicate, hydrous	14807-96-6	NA 113	2658	Adjuvant	Inorganic
Magnesium sulfate	7487-88-9	50503	1339	Molluscicide, Adjuvant	Inorganic
Malachite (copper equivalent 57%)	1319-53-5	#####	NA 155	N/A	Inorganic-Copper
Mancozeb	2233100	14504	211	Fungicide	Dithiocarbamate, Inorganic-Zinc
Maneb and nickel sulfate hexahydrate (014505 + 050505)	8005-46-7	#####	NA 158	Fungicide	Dithiocarbamate, Inorganic-Nickel
Manganese (II) oxide	1344-43-0	NA 104	3274	N/A	Inorganic
Manganese arsenate	7784-38-5	13506	NA 127	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Manganese carbamate	NA 55	NA 103	3273	N/A	Inorganic
Manganese sulfate	7785-87-7	NA 105	658	N/A	Inorganic
Manganous oxide	1344-43-0	NA 143	3275	N/A	Inorganic
Mercuric acetate	1600-27-7	52104	NA 441	N/A	Inorganic-Mercury, Heavy metal
Mercuric chloride	7487-94-7	52001	372	Fungicide	Inorganic-Mercury, Heavy metal
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Mercuric iodide	7774-29-0	52003	NA 438	N/A	Inorganic-Mercury, Heavy metal
Mercuric oleate	1191-80-6	52105	3276	N/A	Inorganic-Mercury, Heavy metal
Mercuric oxide	21908-53-2	52102	955	Fungicide	Inorganic-Mercury, Heavy metal
Mercury	7439-97-6	52301	NA 26	N/A	Inorganic-Mercury,

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
					Heavy metal
Mercury naphthenate	1336-96-5	52101	NA 439	Wood Preservative, Insecticide, Fungicide	Inorganic-Mercury, Heavy metal
Mercury pentanedione	14024-55-6	52103	NA 440	N/A	Inorganic-Mercury, Heavy metal
Mercury phenate	588-66-9	52106	NA 442	N/A	Inorganic-Mercury, Heavy metal
Metallic silver	7440-22-4	72501	2125	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Metiram	9006-42-2	14601	493	Fungicide	Dithiocarbamate, Inorganic-Zinc
Mica	12003-33-2	NA 118	3690	N/A	Inorganic
Mixed copper chelates or complex blend of copper salts	NA 1437	NA 213	NA 212	Fungicide	Inorganic-Copper
Molybdenum	7439-98-7	NA 152	3903	N/A	Inorganic
Molybdic acid, disodium salt	7631-95-0	NA 135	2690	N/A	Inorganic
Mono-potassium salts of phosphorous acid	13977-65-6	76416	NA 705	Fungicide, Microbiocide	Inorganic
Monosodium phosphate	7558-80-7	76409	1772	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
N-(2-hydroxyethyl) ethylene diamine triacetic acid, copper salt	NA 1025	NA 122	1130	N/A	Inorganic-Copper
Neodecanoic acid, copper salt	50315-14-5	97503	NA 854	N/A	Inorganic-Copper
Nickel	7440-02-0	NA 121	762	N/A	Inorganic-Nickel
Nickel diethyl hexyl acid phosphate complex	NA 928	NA 53	3696	N/A	Inorganic-Nickel
Nickel sulfate (anhydrous)	7786-81-4	50508	NA 420	Fungicide	Inorganic-Nickel
Nickel sulfate hexahydrate	10101-97-0	50505	NA 419	Fungicide	Inorganic-Nickel
Nitric acid	7697-37-2	45951	NA 389	N/A	Inorganic
Nitric acid technical	7697-37-2	NA 47	2703	N/A	Inorganic
Nitrogen trichloride	10025-85-1	NA 50	2705	N/A	Inorganic
Nitrogen, liquified	7727-37-9	#####	2267	Insecticide	Inorganic
Nitrous oxide	10024-97-2	NA 115	3302	N/A	Inorganic
Noury dry cobalt 12%	NA 21	NA 33	2712	N/A	Inorganic
Nuxtra manganese 12% catalyst	NA 746	NA 135	2719	N/A	Inorganic
o-Phenylphenol, alkyl* amine - zinc salt of *(100% C18)	82010-74-0	64107	NA 533	Microbiocide	Phenols, Inorganic-Zinc
Oxalic acid	144-62-7	9601	899	Microbiocide	Inorganic
Ozone	10028-15-6	NA 228	NA 228	Water Treatment, Microbiocide	Inorganic
p-tert-Octylphenoxyethoxyethyl dimethyl benzyl ammonium mercuric chloride	53433-01-5	52002	NA 437	Microbiocide	Inorganic-Mercury, Heavy metal
Paris green	12002-03-8	22601	460	Wood Preservative	Inorganic-Arsenic, Inorganic-Copper, Heavy metal

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Penta potassium triphosphate	13845-36-8	76412	3319	N/A	Inorganic
Pentachlorophenol, zinc salt	2917-32-0	63008	NA 510	Wood Preservative, Microbiocide, Algacide, Fungicide	Chlorinated Phenol, Inorganic-Zinc
Perboric acid, sodium salt	NA 1160	NA 174	5452	Insecticide	Inorganic
Perboric acid, sodium salt, monohydrate	10332-33-9	11105	5052	Insecticide	Inorganic
Perchloric acid, calcium salt	13477-36-6	NA 670	3321	N/A	Inorganic
Perlite	NA 756	NA 136	2767	N/A	Inorganic
Peroxyacetic acid	79-21-0	63201	2291	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Peroxydisulfuric acid	13445-49-3	63601	NA 524	N/A	Inorganic
Phosphine	7803-51-2	66500	3541	Fumigant, Insecticide	Inorganic
Phosphoric acid	7664-38-2	76001	871	Fungicide, pH Adjustment, Herbicide, Microbiocide	Inorganic
Phosphoric acid, disodium salt, dihydrate	10028-24-7	76415	NA 703	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Phosphoric acid, monopotassium salt	7778-77-0	76413	2777	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Phosphoric acid, trisodium salt (chlorinated)	56802-99-4	#####	3851	Water Treatment	Inorganic
Phosphorous acid	13598-36-2	76002	NA 699	Fungicide, Microbiocide	Inorganic
Phosphorus	7723-14-0	66502	513	N/A	Inorganic
Phosphorus pentasulfide	1314-56-3	NA 640	2778	N/A	Inorganic
Polyoxin D zinc salt	146659-78-1	#####	NA 129	Fungicide	Inorganic-Zinc
Potassium aluminum silicate	NA 996	NA 774	3344	Adjuvant	Inorganic
Potassium aluminum sulfate	7784-24-9	NA 775	3345	Insecticide, Herbicide	Inorganic
Potassium arsenite	10124-50-2	13605	NA 131	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium arsenite	13464-35-2	13605	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium azide	20762-60-1	#####	NA 898	N/A	Inorganic
Potassium bicarbonate	298-14-6	73508	5037	Fungicide	Inorganic
Potassium bifluoride	7789-29-9	75203	NA 687	N/A	Inorganic
Potassium bisulfate	7646-93-7	5605	1860	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Potassium bromide	2138164	13903	1090	Microbiocide	Inorganic
Potassium carbonate	584-08-7	73504	1620	pH Adjustment, Fungicide,	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Microbiocide, Herbicide	
Potassium chlorate	696616	73303	3347	Defoliant, Herbicide, Microbiocide	Inorganic
Potassium chloride	7447-40-7	13904	NA 137	N/A	Inorganic
Potassium chromate	7789-00-6	68301	700	Wood Preservative	Inorganic- Chromium(VI), Heavy metal
Potassium cyanate	590-28-3	68002	NA 600	N/A	Inorganic
Potassium cyanide	151-50-8	#####	497	Rodenticide	Inorganic
Potassium dichromate	7778-50-9	68302	2167	Wood Preservative	Inorganic- Chromium(VI)
Potassium hexafluoroarsenate	17029-22-0	#####	NA 160	N/A	Inorganic-arsenic, Heavy metal
Potassium hydroxide	1310-58-3	75602	1306	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Potassium hypochlorite	7778-66-7	#####	NA 110	Microbiocide	Inorganic
Potassium iodate	2138256	75703	NA 696	N/A	Inorganic
Potassium iodate (KH(IO3)2)	13455-24-8	75704	NA 697	N/A	Inorganic
Potassium iodide	7681-11-0	75701	1003	Microbiocide	Inorganic
Potassium mercuric iodide	7783-33-7	52107	NA 443	N/A	Inorganic-Mercury, Heavy metal
Potassium monopersulfate	10361-76-9	#####	NA 104	N/A	Inorganic
Potassium nitrate	7757-79-1	76103	726	Rodenticide, Microbiocide	Inorganic
Potassium nitrite	7758-09-0	76203	3356	Rodenticide, Microbiocide	Inorganic
Potassium permanganate	7722-64-7	68501	498	Fungicide, Algaecide, Molluscicide, Microbiocide	Inorganic
Potassium peroxydisulfate	7727-21-1	63602	1028	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Potassium peroxymonosulfate	10058-23-8	63604	1859	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Potassium peroxymonosulfate sulfate, (2KHSO5.KHSO4.K2SO4)	37222-66-5	63607	NA 527	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Potassium peroxymonosulfate sulfate, (2KHSO5.KHSO4.K2SO4)	70693-62-8	63607	NA 528	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Potassium phosphate	7778-53-2	76407	3358	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Potassium phosphate, dibasic	2138438	#####	3359	pH Adjustment, Fungicide,	Inorganic



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Herbicide, Microbiocide	
Potassium phosphite	NA 1565	NA 229	5766	Fungicide	Inorganic
Potassium phosphonate (phosphorous acid equivalent)	NA 1563	NA 227	NA 227	Fungicide	Inorganic
Potassium polysulfide	37199-66-9	76703	NA 708	Insecticide, Fungicide	Inorganic
Potassium pyrophosphate	7320-34-5	76408	1175	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Potassium silicate	1312-76-1	72606	2826	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Potassium sulfate	7778-80-5	5603	3362	Insecticide, Herbicide	Inorganic
Potassium sulfite	10117-38-1	NA 785	3364	Fungicide	Inorganic
Potassium tetraborate	1332-77-0	NA 144	3365	Insecticide	Inorganic
Potassium tetrathionate	13932-13-3	75903	NA 698	Insecticide, Herbicide	Inorganic
Potassium thiocyanate	333-20-0	68201	NA 605	Insecticide	Inorganic
Potassium thiosulfate	10233-00-8	80102	NA 773	Insecticide, Fungicide, Herbicide	Inorganic
Potassium triiodide	12298-68-9	46917	5066	Microbiocide	Inorganic
Propineb	12071-83-9	#####	NA 155	Fungicide, Microbiocide	Dithiocarbamate, Inorganic-Zinc
Pumice	1332-09-8	NA 150	3777	N/A	Inorganic
Quartz sand	NA 1363	NA 193	NA 192	Insect Repellent	Inorganic
Rock powder	NA 1375	NA 194	NA 194	N/A	Inorganic
Selenium and compounds	7782-49-2	72001	NA 31	N/A	Inorganic
Selenium disulfide	7488-56-4	72003	NA 673	N/A	Inorganic
Shale	NA 459	NA 821	3794	N/A	Inorganic
Silica aerogel	63231-67-4	72602	529	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Silica gel	63231-67-4	72602	3557	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Silica hydrate	NA 461	NA 824	2853	N/A	Inorganic
Silica, crystalline-fused	60676-86-0	NA 823	2851	N/A	Inorganic
Silica, crystalline-quartz	14808-60-7	NA 138	2852	N/A	Inorganic
Silicic acid	1343-98-2	NA 825	3556	N/A	Inorganic
Silicon dioxide fresh water fossils	NA 1524	NA 223	NA 223	Insecticide	Inorganic
Silver acetate	563-63-3	72507	NA 676	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver carbonate	534-16-7	72509	NA 678	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver chloride	7783-90-6	72506	2324	Microbiocide,	Inorganic-Silver,

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Fungicide, Herbicide	Heavy metal
Silver copper zeolite	130328-19-7	#####	NA 110	Microbiocide	Inorganic-Silver, Heavy metal, Inorganic-Copper
Silver fluoride	7775-41-9	72502	NA 674	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver iodide, colloidal	7783-96-2	NA 124	1556	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver nitrate	7761-88-8	72503	2856	Microbiocide, Fungicide, Herbicide, Plant Growth Regulator	Inorganic-Silver, Heavy metal
Silver orthophosphate (Ag <sub>3</sub> PO <sub>4</sub> )	7784-09-0	72510	NA 679	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	1301-96-8	#####	NA 111	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	155645-89-9	#####	NA 111	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver sodium hydrogen zirconium phosphate (Ag <sub>0.18</sub> Na <sub>0.57</sub> H <sub>0.25</sub> Zr <sub>2</sub> (PO <sub>4</sub> ) <sub>3</sub> )	NA 1166	72560	NA 164	Microbiocide	Inorganic-Silver, Heavy metal
Silver thiocyanate	1701-93-5	68203	NA 606	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver thiuronium acrylate co- polymer	53404-00-5	72701	NA 681	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver zeolite	130328-18-6	#####	NA 125	Microbiocide	Inorganic-Silver, Heavy metal
Silver zinc zeolite	130328-20-0	#####	NA 111	Microbiocide	Inorganic-Silver, Inorganic-Zinc, Heavy metal
Silver, ionic	14701-21-4	NA 169	5150	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Soapstone	NA 465	NA 829	3797	N/A	Inorganic
Sodium	7440-23-5	NA 830	2858	N/A	Inorganic
Sodium acid phosphate	7558-80-7	76409	1413	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Sodium acid pyrophosphate	7758-16-9	NA 831	3381	pH Adjustment	Inorganic
Sodium aluminate	1302-42-7	NA 145	3382	N/A	Inorganic
Sodium aluminum fluosilicate	53404-77-6	75308	NA 691	Insecticide	Inorganic
Sodium aluminum phosphate	7785-88-8	NA 832	3383	N/A	Inorganic
Sodium arsenate	13464-38-5	13505	283	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Sodium arsenite	7784-46-5	13603	534	Herbicide, Insecticide, Rodenticide, Fungicide	Inorganic-arsenic, Heavy metal
Sodium azide	26628-22-8	#####	NA 897	N/A	Inorganic
Sodium bicarbonate	144-55-8	73505	1134	Fungicide, pH Adjustment	Inorganic
Sodium bichromate dihydrate	7789-12-0	68306	3980	Wood Preservative	Inorganic- Chromium(VI), Inorganic
Sodium bifluoride	1333-83-1	75201	3385	N/A	Inorganic
Sodium binoxalate	1186-49-8	9602	NA 110	Microbiocide	Inorganic
Sodium bisulfate	7681-38-1	73201	905	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Sodium bisulfite	7631-90-5	78201	547	pH Adjustment, Fungicide	Inorganic
Sodium borohydride	16940-66-2	NA 834	3387	N/A	Inorganic
Sodium bromate	7789-38-0	13908	NA 138	N/A	Inorganic
Sodium bromide	7647-15-6	13907	1103	Molluscicide, Herbicide, Insecticide, Microbiocide	Inorganic
Sodium carbonate	497-19-8	73506	854	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Sodium chlorate	2144591	73301	536	Defoliant, Herbicide, Microbiocide	Inorganic
Sodium chloride	7647-14-5	13905	721	Molluscicide, Herbicide, Insecticide, Microbiocide	Inorganic
Sodium chlorite	7758-19-2	20502	2148	Microbiocide, Water Treatment	Inorganic
Sodium chromate	2144646	68303	1241	Wood Preservative	Inorganic- Chromium(VI), Heavy metal
Sodium cyanide	143-33-9	74002	688	Rodenticide	Inorganic
Sodium dichromate	10588-01-9	68304	3395	Wood Preservative	Inorganic- Chromium(VI), Heavy metal
Sodium dihydrogen phosphate	7558-80-7	76409	1022	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Sodium fluoride	7681-49-4	75202	537	Wood Preservative, Insecticide	Inorganic
Sodium fluosilicate	16893-85-9	75306	538	Insecticide	Inorganic
Sodium hexametaphosphate	10124-56-8	76402	1623	pH Adjustment	Inorganic
Sodium hydrosulfite	7775-14-6	78202	3408	pH Adjustment	Inorganic
Sodium hydroxide	1310-73-2	75603	362	pH Adjustment,	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Fungicide, Herbicide, Microbiocide	
Sodium hypobromite	NA 1442	NA 214	NA 213	Microbiocide	Inorganic
Sodium hypochlorite	7681-52-9	14703	539	Microbiocide, Water Treatment, Nematicide	Inorganic
Sodium hypophosphate	13721-43-2	NA 848	3409	N/A	Inorganic
Sodium hypophosphite	7681-53-0	NA 849	3410	N/A	Inorganic
Sodium iodide	7681-82-5	75702	NA 695	N/A	Inorganic
Sodium metabisulfite	7681-57-4	NA 191	NA 190	Fungicide	Inorganic
Sodium metaborate	7775-19-1	11104	689	Insecticide	Inorganic
Sodium metaborate octahydrate	NA 1045	NA 154	4012	Insecticide	Inorganic
Sodium metaborate tetrahydrate	NA 1046	NA 154	4013	Insecticide	Inorganic
Sodium metasilicate	6834-92-0	72604	940	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Sodium metasilicate, anhydrous	6834-92-0	72604	1840	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Sodium molybdate	7631-95-0	NA 855	1761	N/A	Inorganic
Sodium nitrate	7631-99-4	76104	696	Rodenticide, Microbiocide	Inorganic
Sodium nitrite	7632-00-0	76204	2862	Rodenticide, Microbiocide	Inorganic
Sodium oxalate	62-76-0	9604	NA 111	Microbiocide	Inorganic
Sodium pentaborate	11139-65-4	NA 862	1347	Insecticide, Plant Growth Regulator	Inorganic
Sodium perborate	2092204	#####	3429	Insecticide	Inorganic
Sodium perborate (NaBO <sub>3</sub> ) tetrahydrate	10486-00-7	11108	NA 115	Insecticide	Inorganic
Sodium permanganate	10101-50-5	NA 145	3430	N/A	Inorganic
Sodium peroxide (Na <sub>2</sub> (O <sub>2</sub> ))	1313-60-6	63606	NA 526	Microbiocide, Fungicide, Herbicide, Rodenticide	Inorganic
Sodium persulfate	7775-27-1	63603	2336	N/A	Inorganic
Sodium phosphate	7558-79-4	76403	1790	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Sodium phosphate, monobasic	7558-80-7	76409	3433	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Sodium polysulfide	1344-08-7	6902	541	Insecticide, Fungicide	Inorganic
Sodium pyroarsenate	13464-42-1	13401	2864	Wood Preservative, Fungicide	Inorganic-arsenic, Heavy metal
Sodium selenate	13410-01-0	72002	NA 672	N/A	Inorganic

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Sodium sesquicarbonate	533-96-0	73507	1292	pH Adjustment, Fungicide, Microbiocide, Herbicide	Inorganic
Sodium silicate	1344-09-8	72603	2865	Insecticide, Adjuvant, Fungicide, Microbiocide	Inorganic
Sodium silicoaluminate	NA 1005	NA 868	2866	Adjuvant	Inorganic
Sodium silver thiosulfate	NA 1398	NA 197	NA 196	Herbicide	Inorganic-Silver, Heavy metal
Sodium sulfate	7757-82-6	5604	1532	Insecticide, Herbicide	Inorganic
Sodium sulfide	1313-82-2	NA 214	NA 213	N/A	Inorganic
Sodium sulfite	7757-83-7	78203	1635	Fungicide	Inorganic
Sodium tetraborate (anhydrous)	1330-43-4	11112	5054	Insecticide, Herbicide, Molluscicide	Inorganic
Sodium tetraborate (pentahydrate)	11130-12-4	NA 871	1808	Insecticide	Inorganic
Sodium tetrathiocarbonate	7345-69-9	#####	2273	Fumigant, Fungicide, Nematicide	Inorganic
Sodium thioarsenate (Na <sub>3</sub> AsO <sub>3</sub> S)	17367-56-5	13507	NA 128	N/A	Inorganic-arsenic, Heavy metal
Sodium thiocyanate	540-72-7	68202	848	Herbicide	Inorganic
Sodium thiosulfate	7772-98-7	80104	332	Insecticide, Fungicide, Herbicide	Inorganic
Sodium tripolyphosphate	7758-29-4	76404	1024	pH Adjustment	Inorganic
Sulfur	7704-34-9	77501	560	Fungicide, Insecticide	Inorganic
Sulfur chloride	10025-67-9	NA 116	3461	N/A	Inorganic
Sulfur dichloride	10545-99-0	NA 915	3462	N/A	Inorganic
Sulfur dioxide	2024422	77601	561	Dessicant	Inorganic
Sulfuric acid	7664-93-9	78001	442	Herbicide, Dessicant, Fungicide, Microbiocide, pH Adjustment	Inorganic
Sulfuryl chloride	7791-25-5	78002	NA 721	N/A	Inorganic
Sulfuryl fluoride	2699-79-8	78003	618	Fumigant	Inorganic
Talc	14807-96-6	NA 923	2911	N/A	Inorganic
Tetracopper calcium oxychloride	1336-15-8	23502	NA 187	Fungicide	Inorganic-Copper
Tetrapotassium pyrophosphate	7320-34-5	76408	1918	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Tetrasodium pyrophosphate	7722-88-5	76405	3474	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Thallium(I) sulfate	7446-18-6	80001	NA 35	Rodenticide	Inorganic, Heavy metal
Titanium dioxide	13463-67-7	NA 954	2942	N/A	Inorganic

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Titanium sulfate	13825-74-6	NA 111	3476	N/A	Inorganic
Tricopper dichloride dimethyldithiocarbamate	7076-63-3	#####	NA 152	Microbiocide	Dithiocarbamate, Inorganic-Copper
Tripotassium phosphate	7778-53-2	76407	1055	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Trisodium phosphate	7601-54-9	76406	1579	pH Adjustment, Fungicide, Herbicide, Microbiocide	Inorganic
Urea	57-13-6	85702	662	Microbiocide, Fungicide	Inorganic
Urea dihydrogen sulfate	21351-39-3	#####	2270	Plant Growth Regulator, Herbicide	Inorganic
Vermiculite	NA 778	NA 140	2983	N/A	Inorganic
Water	NA 557	NA 101	2987	Solvent	Inorganic
Zinc	7440-66-6	#####	2310	Herbicide	Inorganic-Zinc
Zinc 2,4,5-trichlorophenate	136-24-3	64221	NA 546	N/A	Chlorinated Phenol, Inorganic-Zinc
Zinc 2-ethyl hexoate	136-53-8	41203	3509	N/A	Inorganic-Zinc
Zinc 2-pyridinethiol-1-oxide	13463-41-7	88002	2128	Microbiocide	Inorganic-Zinc
Zinc 8-quinolinolate	13978-85-3	24005	NA 196	Fungicide, Microbiocide	Inorganic-Zinc
Zinc abietate	6798-76-1	NA 112	3506	N/A	Inorganic-Zinc
Zinc arsenate	13464-44-3	13301	NA 125	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Heavy metal, Inorganic-Zinc
Zinc arsenite	28837-97-0	13604	NA 130	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Inorganic-Zinc, Heavy metal
Zinc bacitracin	1405-89-6	6309	NA 87	Microbiocide	Inorganic-Zinc
Zinc carbonate	3486-35-9	NA 102	3507	N/A	Inorganic-Zinc
Zinc chloride	7646-85-7	87801	624	Microbiocide	Inorganic-Zinc
Zinc dehydroabietyl ammonium 2-ethylhexanoate	53404-92-5	4211	NA 75	Fungicide, Microbiocide	Inorganic-Zinc
Zinc dodecyl benzene sulfonate	12068-16-5	NA 112	3508	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap, Inorganic-Zinc
Zinc fluosilicate	16871-71-9	75307	1019	Insecticide	Inorganic-Zinc
Zinc formate	557-41-5	87802	NA 838	N/A	Inorganic-Zinc
Zinc hydroxide	20427-58-1	88501	3510	N/A	Inorganic-Zinc
Zinc isodecanoate	30304-30-4	41222	NA 355	N/A	Inorganic-Zinc
Zinc isononanoate	5398-80-6	41212	NA 353	N/A	Inorganic-Zinc
Zinc isooctanoate	84082-93-9	41205	NA 351	N/A	Inorganic-Zinc
Zinc mercury chromate	22323-45-1	21004	NA 170	Fungicide	Inorganic-Mercury, Inorganic-chromium(VI), Inorganic-Zinc, Heavy metal
Zinc naphthenate	12001-85-3	88301	1111	Wood Preservative, Insecticide, Fungicide, Dog	Inorganic-Zinc

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				and Cat Repellent	
Zinc neodecanoate	27253-29-8	97502	NA 853	N/A	Inorganic-Zinc
Zinc oxide	1314-13-2	88502	666	Fungicide, Adjuvant	Inorganic-Zinc
Zinc petroleum (C20-C30)sulfonate	68989-17-3	88503	NA 841	N/A	Inorganic-Zinc
Zinc phenol sulfonate	127-82-2	89002	NA 842	N/A	Inorganic-Zinc
Zinc phosphide	1314-84-7	88601	626	Rodenticide	Inorganic-Zinc
Zinc resinate	9010-69-9	77001	NA 712	N/A	Inorganic-Zinc
Zinc silicate	NA 1318	8103	NA 176	Microbiocide	Inorganic-Zinc
Zinc stearate	557-05-1	77002	3511	N/A	Inorganic-Zinc
Zinc sulfate	7733-02-0	89001	667	Microbiocide, Herbicide	Inorganic-Zinc
Zinc sulfate, anhydrous	7733-02-0	89001	1852	Microbiocide, Herbicide	Inorganic-Zinc
Zinc sulfate, basic	68813-94-5	89101	NA 843	N/A	Inorganic-Zinc
Zinc sulfate, monohydrate	7446-19-7	#####	2995	Herbicide	Inorganic-Zinc
Zinc trichlorophenate	30143-22-7	64213	NA 543	Microbiocide	Chlorinated Phenol, Inorganic-Zinc
Zineb	12122-67-7	14506	627	Fungicide	Dithiocarbamate, Inorganic-Zinc
Zineb-ethylene thiuram disulfide adduct	NA 1465	NA 217	NA 216	Fungicide	Dithiocarbamate, Inorganic-Zinc
Ziram	137-30-4	34805	629	Fungicide, Microbiocide, Dog and Cat Repellent	Dithiocarbamate, Inorganic-Zinc
Ziram, cyclohexylamine complex	16509-79-8	34806	1328	Dog and Cat Repellent, Fungicide	Dithiocarbamate, Inorganic-Zinc
(3-Ethoxypropyl)mercury bromide	6012-84-6	#####	NA 147	Fungicide	Organomercury, Heavy metal
(3-Hydroxy-2-methoxypropyl)mercuric acetate	69653-69-6	#####	NA 153	N/A	Organomercury, Heavy metal
10,10'-Oxybisphenoxyarsine	58-36-6	12601	1402	Fungicide, Microbiocide	Organoarsenic, Heavy metal
2-(acetoxymethyl)ethanol	4665-55-8	41501	NA 356	N/A	Organomercury, Heavy metal
3-(Hydroxymethyl)-4-nitro-phenol, sodium salt	53404-55-0	52604	NA 447	Microbiocide	Organomercury, Heavy metal
Ammonium arsenate	7784-44-3	13601	2380	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Ammonium dichromate	2149701	68305	NA 607	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Anilino-cadmium dilactate	19651-91-3	64601	NA 548	N/A	Inorganic-Cadmium, Heavy metal
Arsenic	7440-38-2	NA 121	710	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic acid	7778-39-4	6801	40	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal

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Arsenic disulfide	56320-22-0	6901	NA 98	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic pentoxide	1303-28-2	6802	631	Fungicide, Insecticide, Rodenticide, Herbicide	Inorganic-arsenic, Heavy metal
Arsenic sulfide	12612-21-4	6901	NA 99	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trioxide	1327-53-3	7001	42	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trisulfide	1303-33-9	6901	NA 97	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenosobenzene	637-03-6	7101	NA 100	N/A	Organoarsenic, Heavy metal
Arsonic acid, (4-aminophenyl)-	98-50-0	#####	NA 109	N/A	Organoarsenic, Heavy metal
Arsonic acid, ammonium salt	58829-95-1	#####	NA 105	Herbicide, Insecticide, Wood Preservative	Inorganic-arsenic, Heavy metal
Azocyclotin	41083-11-8	#####	2408	Insecticide	Organotin, Heavy metal
Basic bismuth gallate	99-26-3	98601	NA 860	N/A	Heavy metal
Basic copper arsenate	16102-92-4	#####	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Basic lead silicate	53466-66-3	48003	NA 417	N/A	Inorganic-Lead, Heavy metal
Bis (tributyltin) adipate	7437-35-6	83117	1990	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis (tributyltin) sulfide	4808-30-4	83113	1886	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis (tributyltin) sulfone	NA 970	NA 476	1665	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) dodeceny succinate	12379-54-3	83101	NA 824	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) salicylate	22330-14-9	83102	5074	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) succinate	4644-96-6	83103	74	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) sulfosalicylate	4419-22-1	83104	NA 825	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tripropyltin) oxide	1067-29-4	83201	NA 829	Microbiocide, Fungicide	Organotin, Heavy metal
Cacodylic acid	75-60-5	12501	32	Herbicide, Defoliant	Organoarsenic, Heavy metal
Cadmium	7440-43-9	NA 460	2438	N/A	Inorganic-Cadmium, Heavy metal
Cadmium carbonate	513-78-0	12901	93	N/A	Inorganic-Cadmium, Heavy metal
Cadmium chloride	10108-64-2	12902	94	N/A	Inorganic-Cadmium, Heavy metal



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Cadmium cocoate	72869-63-7	NA 459	3085	N/A	Inorganic-Cadmium, Heavy metal
Cadmium oxide	1306-19-0	#####	NA 130	N/A	Inorganic-Cadmium, Heavy metal
Cadmium perborate	NA 969	NA 461	3086	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sebacate	939499	12903	699	N/A	Inorganic-Cadmium, Heavy metal
Cadmium succinate	141-00-4	12904	92	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sulfate	10124-36-4	12905	NA 123	N/A	Inorganic-Cadmium, Heavy metal
Cadmium yellow pigments	NA 967	NA 448	2439	N/A	Inorganic-Cadmium, Heavy metal
Calcium acid methanearsonate	5902-95-4	13806	101	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calcium arsenate	7778-44-1	13501	96	Herbicide, Insecticide, Rodenticide, Molluscicide	Inorganic-arsenic, Heavy metal
Calcium arsenite	53404-59-4	13602	NA 129	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Calcium methanearsonate	6423-72-9	13809	NA 136	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calcium propanearsonate	126-94-3	13801	NA 133	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calomel	10112-91-1	52201	100	Fungicide	Inorganic-Mercury, Heavy metal
Chloromethoxy propyl mercuric acetamide	1319-86-4	18401	887	N/A	Organomercury, Heavy metal
Chromated zinc chloride	NA 1026	87801	1187	Insecticide, Herbicide, Microbiocide	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Chromic acetate	1066-30-4	21102	NA 172	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic acid	7738-94-5	21101	1188	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic oxide	1308-38-9	21103	NA 173	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Copper arsenate	10103-61-4	22801	NA 178	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper arsenite	10290-12-7	22401	NA 177	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper-zinc chromate complex	1344-74-7	21003	163	Fungicide, Wood Preservative	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal, Inorganic-Copper
Crag turf fungicide 531 (Cd-Cu-Ca-Zn-Chromate)	12001-20-6	21006	NA 171	Fungicide	Inorganic-Cadmium, Inorganic-

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					Chromium(VI), Inorganic-Zinc, Heavy metal
Cupric acetoarsenite	12002-03-8	22601	2485	Wood Preservative	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Cyhexatin	13121-70-5	#####	1638	Insecticide	Organotin, Heavy metal
Decafentin	15652-38-7	#####	NA 132	N/A	Organotin, Heavy metal
Di(phenylmercuri) ammonium propionate	18467-88-4	66002	NA 551	N/A	Organomercury, Heavy metal
Di(phenylmercuric) dodecenyl succinate	27236-65-3	66001	501	Microbiocide, Fungicide	Organomercury, Heavy metal
Dibutyltin dichloride	683-18-1	83123	NA 828	N/A	Organotin, Heavy metal
Dodecyl ammonium methanearsonate	53404-47-0	13805	857	Herbicide, Defoliant	Organoarsenic, Heavy metal
DSMA	144-21-8	13802	251	Herbicide, Defoliant	Organoarsenic, Heavy metal
Ethylene oxide condensate of abietylamine, tributyltin chloride	56573-85-4	NA 126	1864	Antifoulant, Microbiocide	Organotin, Heavy metal
Ethylmercuric phosphate	2235-25-8	41505	357	N/A	Organomercury, Heavy metal
Ethylmercurichlorendiimide	2597-93-5	45301	NA 383	N/A	Organomercury, Heavy metal
Ethylmercurithiosalicylic acid	148-61-8	78902	NA 724	Fungicide	Organomercury, Heavy metal
Ethylmercury 2,3- dihydroxypropylmercaptide	2597-92-4	41507	NA 361	Fungicide	Organomercury, Heavy metal
Ethylmercury acetate	109-62-6	41502	NA 357	Fungicide	Organomercury, Heavy metal
Ethylmercury bromide	107-26-6	#####	NA 149	Fungicide	Organomercury, Heavy metal
Ethylmercury chloride	107-27-7	41503	NA 358	Fungicide	Organomercury, Heavy metal
Ethylmercury pentachlorophenate	22232-28-6	41504	NA 359	Microbiocide	Organomercury, Chlorinated Phenol, Heavy metal
Fatty acid* - silver complex *(100% C8)	24927-67-1	72505	NA 675	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Fenbutatin-oxide	13356-08-6	#####	1876	Insecticide	Organotin, Heavy metal
Fentin hydroxide	76-87-9	83601	599	Fungicide, Molluscicide, Herbicide	Organotin, Heavy metal
Hydroxymercuri-o-nitrophenol	30284-78-7	52601	2606	Microbiocide	Organomercury, Heavy metal
Hydroxymercuri-o-nitrophenol, sodium salt	1300-34-1	52602	NA 445	Microbiocide	Organomercury, Heavy metal
Hydroxymercurichlorophenols	53466-93-6	46002	NA 391	Microbiocide	Organomercury, Heavy metal
Hydroxymercuriphenyl ammonium triethanolamine	53466-95-8	46003	NA 392	Microbiocide	Organomercury, Heavy metal

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Hydroxymercury cresol	12379-66-7	46001	NA 390	Microbiocide	Inorganic-Mercury, Heavy metal, Phenols
Lactoxymercuriphenyl ammonium lactate	53466-98-1	51901	NA 429	Microbiocide	Organomercury, Heavy metal
Lauric acid, barium cadmium salt	15337-60-7	NA 118	3676	Adjuvant	Inorganic-Cadmium, Heavy metal
Lead	7439-92-1	NA 134	2638	N/A	Inorganic-Lead, Heavy metal
Lead acetate	301-04-2	48001	NA 415	N/A	Inorganic-Lead, Heavy metal
Lead arsenate	7784-40-9	13503	353	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead arsenate, basic	1327-31-7	13502	354	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead metasilicate	NA 938	NA 138	1106	N/A	Inorganic-Lead, Heavy metal
Lead monoxide	10190-55-3	NA 123	1271	N/A	Inorganic-Lead, Heavy metal
Lead naphthenate	61790-14-5	48004	3296	N/A	Inorganic-Lead, Heavy metal
Litharge	1317-36-8	48002	NA 416	N/A	Inorganic-Lead, Heavy metal
Magnesium arsenate	10103-50-1	13504	NA 126	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Manganese arsenate	7784-38-5	13506	NA 127	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Mercuric acetate	1600-27-7	52104	NA 441	N/A	Inorganic-Mercury, Heavy metal
Mercuric chloride	7487-94-7	52001	372	Fungicide	Inorganic-Mercury, Heavy metal
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Mercuric iodide	7774-29-0	52003	NA 438	N/A	Inorganic-Mercury, Heavy metal
Mercuric oleate	1191-80-6	52105	3276	N/A	Inorganic-Mercury, Heavy metal
Mercuric oxide	21908-53-2	52102	955	Fungicide	Inorganic-Mercury, Heavy metal
Mercury	7439-97-6	52301	NA 26	N/A	Inorganic-Mercury, Heavy metal
Mercury naphthenate	1336-96-5	52101	NA 439	Wood Preservative, Insecticide, Fungicide	Inorganic-Mercury, Heavy metal
Mercury pentanedione	14024-55-6	52103	NA 440	N/A	Inorganic-Mercury, Heavy metal
Mercury phenate	588-66-9	52106	NA 442	N/A	Inorganic-Mercury, Heavy metal
Metallic silver	7440-22-4	72501	2125	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal

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Methane arsonic acid (MAA)	124-58-3	#####	NA 27	N/A	Organoarsenic, Heavy metal
Methoxyethylmercury acetate	151-38-2	41508	NA 362	Fungicide	Organomercury, Heavy metal
Methylenebis(thiocyanate) with TBTO	76397-81-4	81408	NA 785	Antifoulant, Microbiocide	Organotin, Heavy metal
Methylmercurichlorendimide	5902-79-4	45302	NA 384	N/A	Organomercury, Heavy metal
Methylmercury 2,3-dihydroxypropylmercaptide	2597-95-7	51905	NA 433	Fungicide	Organomercury, Heavy metal
Methylmercury 8-hydroxyquinolate	86-85-1	51902	NA 430	Fungicide	Organomercury, Heavy metal
Methylmercury acetate	108-07-6	51903	NA 431	Fungicide	Organomercury, Heavy metal
Methylmercury benzoate	3626-13-9	51904	NA 432	Fungicide	Organomercury, Heavy metal
Methylmercury dicyano diamide	502-39-6	51909	454	Fungicide	Organomercury, Heavy metal
Methylmercury hydroxide	1184-57-2	51906	NA 434	Fungicide	Organomercury, Heavy metal
Methylmercury nitrile	2597-97-9	51907	NA 435	Fungicide	Organomercury, Heavy metal
Methylmercury propionate	1460883	51908	NA 436	Fungicide	Organomercury, Heavy metal
Monoammonium methanearsonate	2321-53-1	13808	NA 135	Herbicide, Defoliant	Organoarsenic, Heavy metal
Monotributyltin salicylate	4342-30-7	83122	NA 827	Antifoulant, Microbiocide	Organotin, Heavy metal
MSMA	2163-80-6	13803	34	Herbicide, Defoliant	Organoarsenic, Heavy metal
N-(Ethylmercury)-p-toluenesulfonanilide	517-16-8	41506	NA 360	Fungicide	Organomercury, Heavy metal
N-(Phenylmercuri) urea	2279-64-3	#####	NA 160	Herbicide	Organomercury, Heavy metal
N-(Phenylmercuri)ethylenediamine	5980-82-5	66009	NA 556	Fungicide	Organomercury, Heavy metal
o-(Chloromercuri)phenol	90-03-9	#####	NA 135	Microbiocide	Organomercury, Heavy metal
o-(Hydroxymercuri)benzoic acid, cyclic anhydride	5722-59-8	52603	NA 446	Microbiocide	Organomercury, Heavy metal
Octylammonium methanearsonate	6379-37-9	13804	27	Herbicide, Defoliant	Organoarsenic, Heavy metal
p-tert-Octylphenoxyethoxyethyl dimethyl benzyl ammonium mercuric chloride	53433-01-5	52002	NA 437	Microbiocide	Inorganic-Mercury, Heavy metal
Paris green	12002-03-8	22601	460	Wood Preservative	Inorganic-Arsenic, Inorganic-Copper, Heavy metal
Phenarsazine chloride	578-94-9	63901	1342	N/A	Organoarsenic, Heavy metal
Phenarsazine oxide	4095-45-8	12602	NA 122	N/A	Organoarsenic, Heavy metal
Phenylmercuriammonium propionate	53404-68-5	66023	NA 567	Fungicide	Organomercury, Heavy metal

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Phenylmercuric 2-ethylhexanoate	13302-00-6	66024	NA 568	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric borate	6273-99-0	66005	NA 552	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric carbonate	53404-69-6	66006	NA 553	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric chloride	100-56-1	66007	NA 554	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric dimethyldithiocarbamate	32407-99-1	66008	NA 555	Microbiocide, Fungicide	Organomercury, Dithiocarbamate, Heavy metal
Phenylmercuric formamide	22894-47-9	66010	NA 557	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric hydroxide	100-57-2	66011	NA 558	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric lactate	122-64-5	66012	1535	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuric monoethanolammonium acetate	5822-97-9	66013	NA 559	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric monoethanolammonium lactate	53404-70-9	66014	NA 560	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric naphthenate	31632-68-5	66015	NA 561	Wood Preservative, Insecticide, Fungicide	Organomercury, Heavy metal
Phenylmercuric nitrate	55-68-5	66016	477	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuric octanoate	13864-38-5	66025	NA 569	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric oleate	104-60-9	66022	853	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuric propionate	103-27-5	66018	NA 563	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric salicylate	28086-13-7	66019	NA 564	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric thiocyanate	16751-55-6	66020	NA 565	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuritriethanolammonium lactate	23319-66-6	66021	NA 566	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercury 8-hydroxyquinolinolate	14354-56-4	66017	NA 562	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercury benzoate	94-43-9	51900	NA 428	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal

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PMA	62-38-4	66003	491	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
PMA, other related	NA 1106	NA 164	90491	Fungicide, Herbicide, Microbiocide	Organomercury, Heavy metal
PMAA	53404-67-4	66004	492	Fungicide, Microbiocide	Organomercury, Heavy metal
Poly (methylmethacrylate-co-tributyltin methacrylate)	26354-18-7	83119	5075	Antifoulant, Microbiocide	Organotin, Heavy metal
Potassium arsenite	10124-50-2	13605	NA 131	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium arsenite	13464-35-2	13605	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium chromate	7789-00-6	68301	700	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Potassium hexafluoroarsenate	17029-22-0	#####	NA 160	N/A	Inorganic-arsenic, Heavy metal
Potassium mercuric iodide	7783-33-7	52107	NA 443	N/A	Inorganic-Mercury, Heavy metal
Pyridylmercuric acetate	1334-77-6	69501	NA 661	N/A	Organomercury, Heavy metal
Pyridylmercuric chloride	1334-75-4	69502	NA 662	N/A	Organomercury, Heavy metal
Silver acetate	563-63-3	72507	NA 676	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver carbonate	534-16-7	72509	NA 678	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver chloride	7783-90-6	72506	2324	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver copper zeolite	130328-19-7	#####	NA 110	Microbiocide	Inorganic-Silver, Heavy metal, Inorganic-Copper
Silver fluoride	7775-41-9	72502	NA 674	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver iodide, colloidal	7783-96-2	NA 124	1556	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver nitrate	7761-88-8	72503	2856	Microbiocide, Fungicide, Herbicide, Plant Growth Regulator	Inorganic-Silver, Heavy metal
Silver orthophosphate (Ag <sub>3</sub> PO <sub>4</sub> )	7784-09-0	72510	NA 679	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	1301-96-8	#####	NA 111	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	155645-89-9	#####	NA 111	Microbiocide,	Inorganic-Silver,

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				Fungicide, Herbicide	Heavy metal
Silver sodium hydrogen zirconium phosphate (Ag <sub>0.18</sub> Na <sub>0.57</sub> H <sub>0.25</sub> Zr <sub>2</sub> (PO <sub>4</sub> ) <sub>3</sub> )	NA 1166	72560	NA 164	Microbiocide	Inorganic-Silver, Heavy metal
Silver thiocyanate	1701-93-5	68203	NA 606	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver thiuronium acrylate co-polymer	53404-00-5	72701	NA 681	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver zeolite	130328-18-6	#####	NA 125	Microbiocide	Inorganic-Silver, Heavy metal
Silver zinc zeolite	130328-20-0	#####	NA 111	Microbiocide	Inorganic-Silver, Inorganic-Zinc, Heavy metal
Silver, ionic	14701-21-4	NA 169	5150	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Sodium arsenate	13464-38-5	13505	283	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Sodium arsenite	7784-46-5	13603	534	Herbicide, Insecticide, Rodenticide, Fungicide	Inorganic-arsenic, Heavy metal
Sodium cacodylate	124-65-2	12502	1673	Herbicide, Defoliant, Rodenticide	Organoarsenic, Heavy metal
Sodium chromate	2144646	68303	1241	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Sodium dichromate	10588-01-9	68304	3395	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Sodium ethylmercurithiosalicylate	54-64-8	78901	NA 723	N/A	Organomercury, Heavy metal
Sodium pyroarsenate	13464-42-1	13401	2864	Wood Preservative, Fungicide	Inorganic-arsenic, Heavy metal
Sodium silver thiosulfate	NA 1398	NA 197	NA 196	Herbicide	Inorganic-Silver, Heavy metal
Sodium thioarsenate (Na <sub>3</sub> AsO <sub>3</sub> S)	17367-56-5	13507	NA 128	N/A	Inorganic-arsenic, Heavy metal
Thallium(I) sulfate	7446-18-6	80001	NA 35	Rodenticide	Inorganic, Heavy metal
Tolylmercuric acetate	1300-78-3	#####	NA 150	Fungicide	Organomercury, Heavy metal
Tri-n-butyltin maleate	14275-57-1	83118	2185	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin acetate	56-36-0	83105	2097	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin acrylate	13331-52-7	83121	NA 826	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin benzoate	4342-36-3	83106	1114	Antifoulant, Microbiocide	Organotin, Heavy metal

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Tributyltin chloride	1461-22-9	83107	1891	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin chloride complex of ethylene oxide condensate of abietylamine	56573-85-4	83108	1412	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin chloride, myristylamine salt	NA 1012	NA 970	938	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin fluoride	29131	83112	1030	Antifoulant, Microbiocide, Fungicide	Organotin, Heavy metal
Tributyltin isopropyl succinate	53404-82-3	83115	1115	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin linoleate	24124-25-2	83109	1116	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin methacrylate	2155-70-6	83120	2179	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin monopropylene glycol maleate	53466-85-6	83110	1985	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin neodecanoate	28801-69-6	83111	1035	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin oxide	56-35-9	83001	569	Antifoulant, Microbiocide, Molluscicide, Fungicide	Organotin, Heavy metal
Tributyltin resinate	13387-91-2	83114	1732	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin sulfide	4808-30-4	83113	1352	Antifoulant, Microbiocide	Organotin, Heavy metal
Triethanolamine cacodylate	69484-14-6	12503	NA 121	Herbicide, Defoliant	Organoarsenic, Heavy metal
Triethanolamine methanearsonate	5902-97-6	13807	NA 134	Herbicide, Defoliant	Organoarsenic, Heavy metal
Trimethyltin chloride	1066-45-1	#####	NA 161	N/A	Organotin, Heavy metal
Triphenylbismuthine	603-33-8	82801	NA 821	N/A	Heavy metal
Triphenylbismuthine dichloride	594-30-9	82802	NA 822	N/A	Heavy metal
Triphenyltin acetate	900-95-8	#####	NA 153	Fungicide, Herbicide	Organotin, Heavy metal
Triphenyltin chloride	639-58-7	#####	NA 153	N/A	Organotin, Heavy metal
Triphenyltin fluoride	379-52-2	83602	2212	Antifoulant	Organotin, Heavy metal
Tripropyltin methacrylate	4154-35-2	83202	NA 830	N/A	Organotin, Heavy metal
Zinc arsenate	13464-44-3	13301	NA 125	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Heavy metal, Inorganic-Zinc
Zinc arsenite	28837-97-0	13604	NA 130	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Inorganic-Zinc, Heavy metal
Zinc mercury chromate	22323-45-1	21004	NA 170	Fungicide	Inorganic-Mercury, Inorganic-chromium(VI), Inorganic-Zinc, Heavy metal
Ammonium arsenate	7784-44-3	13601	2380	Herbicide,	Inorganic-arsenic,



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				Insecticide, Rodenticide	Heavy metal
Arsenic	7440-38-2	NA 121	710	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic acid	7778-39-4	6801	40	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic disulfide	56320-22-0	6901	NA 98	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic pentoxide	1303-28-2	6802	631	Fungicide, Insecticide, Rodenticide, Herbicide	Inorganic-arsenic, Heavy metal
Arsenic sulfide	12612-21-4	6901	NA 99	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trioxide	1327-53-3	7001	42	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsenic trisulfide	1303-33-9	6901	NA 97	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Arsonic acid, ammonium salt	58829-95-1	#####	NA 105	Herbicide, Insecticide, Wood Preservative	Inorganic-arsenic, Heavy metal
Basic copper arsenate	16102-92-4	#####	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Calcium arsenate	7778-44-1	13501	96	Herbicide, Insecticide, Rodenticide, Molluscicide	Inorganic-arsenic, Heavy metal
Calcium arsenite	53404-59-4	13602	NA 129	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Copper arsenate	10103-61-4	22801	NA 178	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper arsenite	10290-12-7	22401	NA 177	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Cupric acetoarsenite	12002-03-8	22601	2485	Wood Preservative	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Lead arsenate	7784-40-9	13503	353	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead arsenate, basic	1327-31-7	13502	354	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Magnesium arsenate	10103-50-1	13504	NA 126	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Manganese arsenate	7784-38-5	13506	NA 127	Herbicide,	Inorganic-arsenic,

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				Insecticide, Rodenticide	Heavy metal
Paris green	12002-03-8	22601	460	Wood Preservative	Inorganic-Arsenic, Inorganic-Copper, Heavy metal
Potassium arsenite	10124-50-2	13605	NA 131	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium arsenite	13464-35-2	13605	NA 132	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Potassium hexafluoroarsenate	17029-22-0	#####	NA 160	N/A	Inorganic-arsenic, Heavy metal
Sodium arsenate	13464-38-5	13505	283	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal
Sodium arsenite	7784-46-5	13603	534	Herbicide, Insecticide, Rodenticide, Fungicide	Inorganic-arsenic, Heavy metal
Sodium pyroarsenate	13464-42-1	13401	2864	Wood Preservative, Fungicide	Inorganic-arsenic, Heavy metal
Sodium thioarsenate (Na <sub>3</sub> AsO <sub>3</sub> S)	17367-56-5	13507	NA 128	N/A	Inorganic-arsenic, Heavy metal
Zinc arsenate	13464-44-3	13301	NA 125	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Heavy metal, Inorganic-Zinc
Zinc arsenite	28837-97-0	13604	NA 130	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Inorganic-Zinc, Heavy metal
Antimony	7440-36-0	NA 516	2388	N/A	Antimony
Antimony potassium tartrate	28300-74-5	6201	3057	Insecticide	Antimony
Diphenylstibene 2-ethylhexanoate	5035-58-5	6202	NA 82	Microbiocide	Antimony
10,10'-Oxybisphenoxyarsine	58-36-6	12601	1402	Fungicide, Microbiocide	Organoarsenic, Heavy metal
Arsenosobenzene	637-03-6	7101	NA 100	N/A	Organoarsenic, Heavy metal
Arsonic acid, (4-aminophenyl)-	98-50-0	#####	NA 109	N/A	Organoarsenic, Heavy metal
Cacodylic acid	75-60-5	12501	32	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calcium acid methanearsonate	5902-95-4	13806	101	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calcium methanearsonate	6423-72-9	13809	NA 136	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calcium propanearsonate	126-94-3	13801	NA 133	Herbicide, Defoliant	Organoarsenic, Heavy metal
Dodecyl ammonium methanearsonate	53404-47-0	13805	857	Herbicide, Defoliant	Organoarsenic, Heavy metal
DSMA	144-21-8	13802	251	Herbicide, Defoliant	Organoarsenic, Heavy metal
Methane arsonic acid (MAA)	124-58-3	#####	NA 27	N/A	Organoarsenic, Heavy metal
Monoammonium	2321-53-1	13808	NA 135	Herbicide,	Organoarsenic,

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methanearsonate				Defoliant	Heavy metal
MSMA	2163-80-6	13803	34	Herbicide, Defoliant	Organoarsenic, Heavy metal
Octylammonium methanearsonate	6379-37-9	13804	27	Herbicide, Defoliant	Organoarsenic, Heavy metal
Phenarsazine chloride	578-94-9	63901	1342	N/A	Organoarsenic, Heavy metal
Phenarsazine oxide	4095-45-8	12602	NA 122	N/A	Organoarsenic, Heavy metal
Sodium cacodylate	124-65-2	12502	1673	Herbicide, Defoliant, Rodenticide	Organoarsenic, Heavy metal
Triethanolamine cacodylate	69484-14-6	12503	NA 121	Herbicide, Defoliant	Organoarsenic, Heavy metal
Triethanolamine methanearsonate	5902-97-6	13807	NA 134	Herbicide, Defoliant	Organoarsenic, Heavy metal
Calomel	10112-91-1	52201	100	Fungicide	Inorganic-Mercury, Heavy metal
Hydroxymercury cresol	12379-66-7	46001	NA 390	Microbiocide	Inorganic-Mercury, Heavy metal, Phenols
Mercuric acetate	1600-27-7	52104	NA 441	N/A	Inorganic-Mercury, Heavy metal
Mercuric chloride	7487-94-7	52001	372	Fungicide	Inorganic-Mercury, Heavy metal
Mercuric dimethyl dithiocarbamate	15415-64-2	34808	709	Microbiocide	Inorganic-Mercury, Heavy metal, Dithiocarbamate
Mercuric iodide	7774-29-0	52003	NA 438	N/A	Inorganic-Mercury, Heavy metal
Mercuric oleate	1191-80-6	52105	3276	N/A	Inorganic-Mercury, Heavy metal
Mercuric oxide	21908-53-2	52102	955	Fungicide	Inorganic-Mercury, Heavy metal
Mercury	7439-97-6	52301	NA 26	N/A	Inorganic-Mercury, Heavy metal
Mercury naphthenate	1336-96-5	52101	NA 439	Wood Preservative, Insecticide, Fungicide	Inorganic-Mercury, Heavy metal
Mercury pentanedione	14024-55-6	52103	NA 440	N/A	Inorganic-Mercury, Heavy metal
Mercury phenate	588-66-9	52106	NA 442	N/A	Inorganic-Mercury, Heavy metal
p-tert-Octylphenoxyethoxyethyl dimethyl benzyl ammonium mercuric chloride	53433-01-5	52002	NA 437	Microbiocide	Inorganic-Mercury, Heavy metal
Potassium mercuric iodide	7783-33-7	52107	NA 443	N/A	Inorganic-Mercury, Heavy metal
Zinc mercury chromate	22323-45-1	21004	NA 170	Fungicide	Inorganic-Mercury, Inorganic-chromium(VI), Inorganic-Zinc, Heavy metal
(3-Ethoxypropyl)mercury bromide	6012-84-6	#####	NA 147	Fungicide	Organomercury, Heavy metal

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
(3-Hydroxy-2-methoxypropyl)mercuric acetate	69653-69-6	#####	NA 153	N/A	Organomercury, Heavy metal
2-(acetoxymercuri)ethanol	4665-55-8	41501	NA 356	N/A	Organomercury, Heavy metal
3-(Hydroxymercuri)-4-nitro-o-phenol, sodium salt	53404-55-0	52604	NA 447	Microbiocide	Organomercury, Heavy metal
Chloromethoxy propyl mercuric acetamide	1319-86-4	18401	887	N/A	Organomercury, Heavy metal
Di(phenylmercuri) ammonium propionate	18467-88-4	66002	NA 551	N/A	Organomercury, Heavy metal
Di(phenylmercuric) dodecenyl succinate	27236-65-3	66001	501	Microbiocide, Fungicide	Organomercury, Heavy metal
Ethylmercuric phosphate	2235-25-8	41505	357	N/A	Organomercury, Heavy metal
Ethylmercurichlorendiimide	2597-93-5	45301	NA 383	N/A	Organomercury, Heavy metal
Ethylmercurithiosalicylic acid	148-61-8	78902	NA 724	Fungicide	Organomercury, Heavy metal
Ethylmercury 2,3-dihydroxypropylmercaptide	2597-92-4	41507	NA 361	Fungicide	Organomercury, Heavy metal
Ethylmercury acetate	109-62-6	41502	NA 357	Fungicide	Organomercury, Heavy metal
Ethylmercury bromide	107-26-6	#####	NA 149	Fungicide	Organomercury, Heavy metal
Ethylmercury chloride	107-27-7	41503	NA 358	Fungicide	Organomercury, Heavy metal
Ethylmercury pentachlorophenate	22232-28-6	41504	NA 359	Microbiocide	Organomercury, Chlorinated Phenol, Heavy metal
Hydroxymercuri-o-nitrophenol	30284-78-7	52601	2606	Microbiocide	Organomercury, Heavy metal
Hydroxymercuri-o-nitrophenol, sodium salt	1300-34-1	52602	NA 445	Microbiocide	Organomercury, Heavy metal
Hydroxymercurichlorophenols	53466-93-6	46002	NA 391	Microbiocide	Organomercury, Heavy metal
Hydroxymercuriphenyl ammonium triethanolamine	53466-95-8	46003	NA 392	Microbiocide	Organomercury, Heavy metal
Lactoxymercuriphenyl ammonium lactate	53466-98-1	51901	NA 429	Microbiocide	Organomercury, Heavy metal
Methoxyethyl mercury chloride	123-88-6	NA 212	NA 211	Fungicide	Organomercury
Methoxyethyl mercury silicate	64491-92-5	NA 208	NA 208	Fungicide	Organomercury
Methoxyethylmercury acetate	151-38-2	41508	NA 362	Fungicide	Organomercury, Heavy metal
Methylmercurichlorendimide	5902-79-4	45302	NA 384	N/A	Organomercury, Heavy metal
Methylmercury 2,3-dihydroxypropylmercaptide	2597-95-7	51905	NA 433	Fungicide	Organomercury, Heavy metal
Methylmercury 8-hydroxyquinolate	86-85-1	51902	NA 430	Fungicide	Organomercury, Heavy metal
Methylmercury acetate	108-07-6	51903	NA 431	Fungicide	Organomercury, Heavy metal
Methylmercury benzoate	3626-13-9	51904	NA 432	Fungicide	Organomercury, Heavy metal
Methylmercury dicyano diamide	502-39-6	51909	454	Fungicide	Organomercury, Heavy metal

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Methylmercury hydroxide	1184-57-2	51906	NA 434	Fungicide	Organomercury, Heavy metal
Methylmercury nitrile	2597-97-9	51907	NA 435	Fungicide	Organomercury, Heavy metal
Methylmercury propionate	1460883	51908	NA 436	Fungicide	Organomercury, Heavy metal
N-(Ethylmercury)-p-toluenesulfonanilide	517-16-8	41506	NA 360	Fungicide	Organomercury, Heavy metal
N-(Phenylmercuri) urea	2279-64-3	#####	NA 160	Herbicide	Organomercury, Heavy metal
N-(Phenylmercuri)ethylenediamine	5980-82-5	66009	NA 556	Fungicide	Organomercury, Heavy metal
o-(Chloromercuri)phenol	90-03-9	#####	NA 135	Microbiocide	Organomercury, Heavy metal
o-(Hydroxymercuri)benzoic acid, cyclic anhydride	5722-59-8	52603	NA 446	Microbiocide	Organomercury, Heavy metal
Phenylmercuriammonium propionate	53404-68-5	66023	NA 567	Fungicide	Organomercury, Heavy metal
Phenylmercuric 2-ethylhexanoate	13302-00-6	66024	NA 568	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric borate	6273-99-0	66005	NA 552	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric carbonate	53404-69-6	66006	NA 553	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric chloride	100-56-1	66007	NA 554	Fungicide, Microbiocide	Organomercury, Heavy metal
Phenylmercuric dimethyldithiocarbamate	32407-99-1	66008	NA 555	Microbiocide, Fungicide	Organomercury, Dithiocarbamate, Heavy metal
Phenylmercuric formamide	22894-47-9	66010	NA 557	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric hydroxide	100-57-2	66011	NA 558	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric lactate	122-64-5	66012	1535	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuric monoethanolammonium acetate	5822-97-9	66013	NA 559	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric monoethanolammonium lactate	53404-70-9	66014	NA 560	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric naphthenate	31632-68-5	66015	NA 561	Wood Preservative, Insecticide, Fungicide	Organomercury, Heavy metal
Phenylmercuric nitrate	55-68-5	66016	477	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuric octanoate	13864-38-5	66025	NA 569	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric oleate	104-60-9	66022	853	Microbiocide, Fungicide,	Organomercury, Heavy metal

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				Herbicide	
Phenylmercuric propionate	103-27-5	66018	NA 563	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric salicylate	28086-13-7	66019	NA 564	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercuric thiocyanate	16751-55-6	66020	NA 565	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercuritriethanolammonium lactate	23319-66-6	66021	NA 566	Microbiocide, Fungicide, Herbicide	Organomercury, Heavy metal
Phenylmercury 8-hydroxyquinolinolate	14354-56-4	66017	NA 562	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercury benzoate	94-43-9	51900	NA 428	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
Phenylmercury nitrate	2227736	NA 209	NA 208	Fungicide	Organomercury
PMA	62-38-4	66003	491	Fungicide, Microbiocide, Herbicide	Organomercury, Heavy metal
PMA, other related	NA 1106	NA 164	90491	Fungicide, Herbicide, Microbiocide	Organomercury, Heavy metal
PMAA	53404-67-4	66004	492	Fungicide, Microbiocide	Organomercury, Heavy metal
Pyridylmercuric acetate	1334-77-6	69501	NA 661	N/A	Organomercury, Heavy metal
Pyridylmercuric chloride	1334-75-4	69502	NA 662	N/A	Organomercury, Heavy metal
Sodium ethylmercurithiosalicylate	54-64-8	78901	NA 723	N/A	Organomercury, Heavy metal
Tolylmercuric acetate	1300-78-3	#####	NA 150	Fungicide	Organomercury, Heavy metal
Anilino-cadmium dilactate	19651-91-3	64601	NA 548	N/A	Inorganic-Cadmium, Heavy metal
Cadmium	7440-43-9	NA 460	2438	N/A	Inorganic-Cadmium, Heavy metal
Cadmium carbonate	513-78-0	12901	93	N/A	Inorganic-Cadmium, Heavy metal
Cadmium chloride	10108-64-2	12902	94	N/A	Inorganic-Cadmium, Heavy metal
Cadmium cocoate	72869-63-7	NA 459	3085	N/A	Inorganic-Cadmium, Heavy metal
Cadmium oxide	1306-19-0	#####	NA 130	N/A	Inorganic-Cadmium, Heavy metal
Cadmium perborate	NA 969	NA 461	3086	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sebacate	939499	12903	699	N/A	Inorganic-Cadmium, Heavy metal
Cadmium succinate	141-00-4	12904	92	N/A	Inorganic-Cadmium, Heavy metal
Cadmium sulfate	10124-36-4	12905	NA 123	N/A	Inorganic-Cadmium, Heavy metal

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Cadmium yellow pigments	NA 967	NA 448	2439	N/A	Inorganic-Cadmium, Heavy metal
Crag turf fungicide 531 (Cd-Cu-Ca-Zn-Chromate)	12001-20-6	21006	NA 171	Fungicide	Inorganic-Cadmium, Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Lauric acid, barium cadmium salt	15337-60-7	NA 118	3676	Adjuvant	Inorganic-Cadmium, Heavy metal
Ammonium dichromate	2149701	68305	NA 607	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromated zinc chloride	NA 1026	87801	1187	Insecticide, Herbicide, Microbiocide	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Chromic acetate	1066-30-4	21102	NA 172	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic acid	7738-94-5	21101	1188	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Chromic oxide	1308-38-9	21103	NA 173	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Copper-zinc chromate complex	1344-74-7	21003	163	Fungicide, Wood Preservative	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal, Inorganic-Copper
Crag turf fungicide 531 (Cd-Cu-Ca-Zn-Chromate)	12001-20-6	21006	NA 171	Fungicide	Inorganic-Cadmium, Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Potassium chromate	7789-00-6	68301	700	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Potassium dichromate	7778-50-9	68302	2167	Wood Preservative	Inorganic-Chromium(VI)
Sodium bichromate dihydrate	7789-12-0	68306	3980	Wood Preservative	Inorganic-Chromium(VI), Inorganic
Sodium chromate	2144646	68303	1241	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Sodium dichromate	10588-01-9	68304	3395	Wood Preservative	Inorganic-Chromium(VI), Heavy metal
Zinc mercury chromate	22323-45-1	21004	NA 170	Fungicide	Inorganic-Mercury, Inorganic-chromium(VI), Inorganic-Zinc, Heavy metal
Acetic acid, copper (2+) salt	142-71-2	NA 697	3013	N/A	Inorganic-Copper
Basic copper arsenate	16102-92-4	#####	NA 132	Herbicide, Insecticide,	Inorganic-arsenic, Heavy metal,

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
				Rodenticide	Inorganic-Copper
Bordeaux mixture	NA 240	NA 478	80	Fungicide	Inorganic-Copper
Chlorophyllin	11006-34-1	NA 191	NA 190	Fungicide, Microbiocide	Inorganic-Copper, Botanical
Copper	7440-50-8	22501	714	Fungicide	Inorganic-Copper
Copper (from triethanolamine complex)	82027-59-6	24403	NA 198	Algaecide	Inorganic-Copper
Copper 2-ethylhexanoate	22221-10-9	41201	2235	Fungicide	Inorganic-Copper
Copper 3-phenylsalicylate	1250682	23801	NA 191	N/A	Inorganic-Copper
Copper 8-quinolinoleate	10380-28-6	24002	159	Fungicide, Microbiocide	Inorganic-Copper
Copper abietate	10248-55-2	23301	NA 184	Fungicide	Inorganic-Copper
Copper acetate	831632	44002	147	Fungicide	Inorganic-Copper
Copper ammonium acetate	NA 1544	NA 225	NA 225	Fungicide	Inorganic-Copper
Copper ammonium carbonate	33113-08-5	22703	1762	Fungicide	Inorganic-Copper
Copper ammonium complex	16828-95-8	22702	3550	Fungicide	Inorganic-Copper
Copper arsenate	10103-61-4	22801	NA 178	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper arsenite	10290-12-7	22401	NA 177	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Copper as elemental from copper - etidronic acid complex	50376-91-5	24404	NA 199	N/A	Inorganic-Copper
Copper beta cyclodextrin hydroxide	NA 1366	NA 193	NA 193	Fungicide	Inorganic-Copper
Copper bronze powder	7440-50-8	22501	1457	Antifoulant	Inorganic-Copper
Copper carbonate, basic	1184-64-1	22901	60	Fungicide, Algaecide, Insecticide	Inorganic-Copper
Copper chloride (anhydrous)	1344-67-8	23802	NA 192	N/A	Inorganic-Copper
Copper chloride (dihydrate)	10125-13-0	23701	NA 190	N/A	Inorganic-Copper
Copper citrate	10402-15-0	44005	1406	N/A	Inorganic-Copper
Copper citrate chelate	NA 961	NA 387	3547	N/A	Inorganic-Copper
Copper complex with ammonia and ethylene diamine tetraacetate	67989-88-2	#####	NA 130	Fungicide	Inorganic-Copper
Copper cresylate	12379-42-9	23001	NA 181	Fungicide	Inorganic-Copper
Copper dehydroabietyl ammonium 2-ethylhexanoate	53404-24-3	41202	NA 349	N/A	Inorganic-Copper
Copper dihydrazinium sulfate	33271-65-7	50504	753	N/A	Inorganic-Copper
Copper ethanolamine complex	14215-52-2	24409	NA 201	Algaecide	Inorganic-Copper
Copper ethanolamine complexes, mixed	NA 1044	NA 146	3551	Algaecide	Inorganic-Copper
Copper ethylenediamine complex	13426-91-0	24407	3549	Herbicide	Inorganic-Copper
Copper gluconate chelate	814-91-5	23305	3548	N/A	Inorganic-Copper
Copper hydrazinium sulfate	53433-02-6	50501	NA 418	Fungicide	Inorganic-Copper
Copper hydroxide	20427-59-2	23401	151	Fungicide, Microbiocide, Nematicide	Inorganic-Copper
Copper hydroxide - triethanolamine complex	NA 1017	NA 105	1826	N/A	Inorganic-Copper
Copper isodecanoate	84082-88-2	41221	NA 354	N/A	Inorganic-Copper



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Copper isononanoate	72915-82-3	41211	NA 352	N/A	Inorganic-Copper
Copper isooctanoate	88859-94-3	41204	NA 350	N/A	Inorganic-Copper
Copper lactate	16039-52-4	23302	NA 185	N/A	Inorganic-Copper
Copper linoleate	7721-15-5	23303	1110	N/A	Inorganic-Copper
Copper metaborate	39290-85-2	22802	NA 179	N/A	Inorganic-Copper
Copper monoethanolamine complex	NA 960	NA 384	3552	N/A	Inorganic-Copper
Copper naphthenate	1338-02-9	23102	153	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper naphthenate	1338-02-9	6000	NA 172	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper naphthenate	1338-02-9	6300	NA 172	Wood Preservative, Insecticide, Fungicide, Dog and Cat Repellent	Inorganic-Copper
Copper nitroacetate	22221-12-1	23201	NA 183	N/A	Inorganic-Copper
Copper octanoate	20543-04-8	23306	5225	Fungicide	Inorganic-Copper
Copper oleate	10402-16-1	23304	154	Fungicide	Inorganic-Copper
Copper oxide (ic)	1317-38-0	42401	2231	Fungicide, Insecticide	Inorganic-Copper
Copper oxide (ous)	1317-39-1	25601	175	Fungicide, Insecticide	Inorganic-Copper
Copper oxychloride	1332-40-7	8001	156	Fungicide	Inorganic-Copper
Copper oxychloride (Cu <sub>2</sub> Cl(OH) <sub>3</sub> )	1332-65-6	23501	NA 186	Fungicide	Inorganic-Copper
Copper oxychloride sulfate	8012-69-9	23503	158	Fungicide	Inorganic-Copper
Copper oxysulfate	12158-97-3	23504	NA 188	N/A	Inorganic-Copper
Copper oxysulfate	82010-79-5	23504	NA 189	N/A	Inorganic-Copper
Copper pentachlorophenate	15773-35-0	63011	NA 512	Wood Preservative, Microbiocide, Algaecide, Fungicide	Chlorinated Phenol, Inorganic-Copper
Copper phosphate	10103-48-7	22902	NA 180	N/A	Inorganic-Copper
Copper phthalocyanine	147-14-8	NA 381	2479	Dye	Inorganic-Copper
Copper pyrophosphate	10102-90-6	69701	NA 663	N/A	Inorganic-Copper
Copper salts of fatty and rosin acids	9007-39-0	23104	155	Fungicide	Inorganic-Copper
Copper salts of the acids of tall oil	61789-22-8	23103	NA 182	N/A	Inorganic-Copper
Copper silicate	1344-72-5	24301	NA 197	N/A	Inorganic-Copper
Copper sodium sulfate-phosphate complex	NA 1023	NA 121	755	N/A	Inorganic-Copper
Copper sulfate (anhydrous)	7758-98-7	24408	1778	Fungicide, Algaecide, Molluscicide	Inorganic-Copper

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Copper sulfate (basic)	1344-73-6	8101	162	Fungicide, Algaecide, Molluscicide	Inorganic-Copper
Copper sulfate (pentahydrate)	7758-99-8	24401	161	Algaecide, Fungicide, Insecticide, Water Treatment, Molluscicide, Nematicide	Inorganic-Copper
Copper sulfate ethylene diamine	NA 1036	NA 132	2480	N/A	Inorganic-Copper
Copper sulfate, monohydrate	10257-54-2	24402	1789	Fungicide, Algaecide, Molluscicide	Inorganic-Copper
Copper sulfate, tri-basic	NA 1384	NA 195	NA 194	Herbicide, Algaecide, Fungicide, Water Treatment	Inorganic-Copper
Copper triethanolamine complex	68027-59-6	NA 125	1615	Algaecide	Inorganic-Copper
Copper-zinc chromate complex	1344-74-7	21003	163	Fungicide, Wood Preservative	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal, Inorganic-Copper
Copper-zinc sulfate complex	55072-57-6	8102	164	Fungicide	Inorganic-Zinc, Inorganic-Copper
Copper-zinc sulfate complex, monohydrate	NA 959	NA 382	1751	Fungicide	Inorganic-Zinc, Inorganic-Copper
Cuprammonium	NA 1382	NA 195	NA 194	Fungicide	Inorganic-Copper
Cupric acetoarsenite	12002-03-8	22601	2485	Wood Preservative	Inorganic-arsenic, Heavy metal, Inorganic-Copper
Cupric ferric subsulfate complex	12168-20-6	42402	NA 365	Molluscicide	Inorganic-Copper
Cupric fluosilicate	12062-24-7	75309	NA 692	Insecticide	Inorganic-Copper
Cupric gluconate	527-09-3	24405	3117	Fungicide	Inorganic-Copper
Cupric nitrate	3251-23-8	76102	3118	N/A	Inorganic-Copper
Cuprous and cupric oxide, mixed	82010-82-0	42403	NA 366	N/A	Inorganic-Copper
Cuprous chloride (Cu <sub>2</sub> Cl <sub>2</sub> )	7758-89-6	#####	5597	Fungicide	Inorganic-Copper
Cuprous iodide	7681-65-4	#####	NA 902	N/A	Inorganic-Copper
Cuprous sulfide	22205-45-4	#####	NA 124	N/A	Inorganic-Copper
Cuprous thiocyanate	1111-67-7	25602	2108	Microbiocide	Inorganic-Copper
Device (swimming pool algaecide, copper generating) no guarantee required	NA 1504	NA 222	NA 222	Algaecide	Inorganic-Copper
Dihydrogen {ethylenediaminetetraacetato(4-)}cuprate(2-)	54453-03-1	24406	NA 200	N/A	Inorganic-Copper
Disodium EDTA-copper	14025-15-1	NA 296	3173	N/A	Inorganic-Copper
EDTA diammonium copper salt	7379-26-2	39117	1613	Algaecide	Inorganic-Copper
EDTA, copper complex	12276-01-6	39105	1135	Algaecide	Inorganic-Copper

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Lignin sulfonic acid, copper salt	NA 933	NA 126	1925	N/A	Inorganic-Copper
Malachite (copper equivalent 57%)	1319-53-5	#####	NA 155	N/A	Inorganic-Copper
Mixed copper chelates or complex blend of copper salts	NA 1437	NA 213	NA 212	Fungicide	Inorganic-Copper
N-(2-hydroxyethyl) ethylene diamine triacetic acid, copper salt	NA 1025	NA 122	1130	N/A	Inorganic-Copper
Neodecanoic acid, copper salt	50315-14-5	97503	NA 854	N/A	Inorganic-Copper
Paris green	12002-03-8	22601	460	Wood Preservative	Inorganic-Arsenic, Inorganic-Copper, Heavy metal
Silver copper zeolite	130328-19-7	#####	NA 110	Microbiocide	Inorganic-Silver, Heavy metal, Inorganic-Copper
Tetracopper calcium oxychloride	1336-15-8	23502	NA 187	Fungicide	Inorganic-Copper
Tricopper dichloride dimethyldithiocarbamate	7076-63-3	#####	NA 152	Microbiocide	Dithiocarbamate, Inorganic-Copper
Azocyclotin	41083-11-8	#####	2408	Insecticide	Organotin, Heavy metal
Bis (tributyltin) adipate	7437-35-6	83117	1990	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis (tributyltin) sulfide	4808-30-4	83113	1886	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis (tributyltin) sulfone	NA 970	NA 476	1665	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) dodeceny succinate	12379-54-3	83101	NA 824	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) salicylate	22330-14-9	83102	5074	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) succinate	4644-96-6	83103	74	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tributyltin) sulfosalicylate	4419-22-1	83104	NA 825	Antifoulant, Microbiocide	Organotin, Heavy metal
Bis(tripropyltin) oxide	1067-29-4	83201	NA 829	Microbiocide, Fungicide	Organotin, Heavy metal
Cyhexatin	13121-70-5	#####	1638	Insecticide	Organotin, Heavy metal
Decafentin	15652-38-7	#####	NA 132	N/A	Organotin, Heavy metal
Dibutyltin dichloride	683-18-1	83123	NA 828	N/A	Organotin, Heavy metal
Ethylene oxide condensate of abietylamine, tributyltin chloride	56573-85-4	NA 126	1864	Antifoulant, Microbiocide	Organotin, Heavy metal
Fenbutatin-oxide	13356-08-6	#####	1876	Insecticide	Organotin, Heavy metal
Fentin hydroxide	76-87-9	83601	599	Fungicide, Molluscicide, Herbicide	Organotin, Heavy metal
Methylenebis(thiocyanate) with TBTO	76397-81-4	81408	NA 785	Antifoulant, Microbiocide	Organotin, Heavy metal
Monotributyltin salicylate	4342-30-7	83122	NA 827	Antifoulant, Microbiocide	Organotin, Heavy metal

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Poly (methylmethacrylate-co-tributyltin methacrylate)	26354-18-7	83119	5075	Antifoulant, Microbiocide	Organotin, Heavy metal
Tin Acrylate Polymers RC 626 & RC 627	NA 1444	NA 214	NA 213	Antifoulant	Organotin
Tri-n-butyltin maleate	14275-57-1	83118	2185	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin acetate	56-36-0	83105	2097	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin acrylate	13331-52-7	83121	NA 826	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin benzoate	4342-36-3	83106	1114	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin chloride	1461-22-9	83107	1891	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin chloride complex of ethylene oxide condensate of abietylamine	56573-85-4	83108	1412	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin chloride, myristylamine salt	NA 1012	NA 970	938	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin fluoride	29131	83112	1030	Antifoulant, Microbiocide, Fungicide	Organotin, Heavy metal
Tributyltin isopropyl succinate	53404-82-3	83115	1115	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin linoleate	24124-25-2	83109	1116	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin methacrylate	2155-70-6	83120	2179	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin monopropylene glycol maleate	53466-85-6	83110	1985	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin naphthenate	85409-17-2	NA 211	NA 210	Fungicide	Organotin
Tributyltin neodecanoate	28801-69-6	83111	1035	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin oxide	56-35-9	83001	569	Antifoulant, Microbiocide, Molluscicide, Fungicide	Organotin, Heavy metal
Tributyltin resinate	13387-91-2	83114	1732	Antifoulant, Microbiocide	Organotin, Heavy metal
Tributyltin sulfide	4808-30-4	83113	1352	Antifoulant, Microbiocide	Organotin, Heavy metal
Trimethyltin chloride	1066-45-1	#####	NA 161	N/A	Organotin, Heavy metal
Triphenyltin acetate	900-95-8	#####	NA 153	Fungicide, Herbicide	Organotin, Heavy metal
Triphenyltin chloride	639-58-7	#####	NA 153	N/A	Organotin, Heavy metal
Triphenyltin fluoride	379-52-2	83602	2212	Antifoulant	Organotin, Heavy metal
Tripropyltin methacrylate	4154-35-2	83202	NA 830	N/A	Organotin, Heavy metal
Basic lead silicate	53466-66-3	48003	NA 417	N/A	Inorganic-Lead, Heavy metal
Lead	7439-92-1	NA 134	2638	N/A	Inorganic-Lead, Heavy metal
Lead acetate	301-04-2	48001	NA 415	N/A	Inorganic-Lead,

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
					Heavy metal
Lead arsenate	7784-40-9	13503	353	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead arsenate, basic	1327-31-7	13502	354	Herbicide, Insecticide, Rodenticide	Inorganic-arsenic, Inorganic-lead, Heavy metal
Lead metasilicate	NA 938	NA 138	1106	N/A	Inorganic-Lead, Heavy metal
Lead monoxide	10190-55-3	NA 123	1271	N/A	Inorganic-Lead, Heavy metal
Lead naphthenate	61790-14-5	48004	3296	N/A	Inorganic-Lead, Heavy metal
Litharge	1317-36-8	48002	NA 416	N/A	Inorganic-Lead, Heavy metal
Alkyl*-1-(2-aminoethyl)-2-imidazoline acetate - nickel sulfate complex	NA 1188	46606	NA 167	Microbiocide	Inorganic-Nickel, Imidazoline
Maneb and nickel sulfate hexahydrate (014505 + 050505)	8005-46-7	#####	NA 158	Fungicide	Dithiocarbamate, Inorganic-Nickel
Nickel	7440-02-0	NA 121	762	N/A	Inorganic-Nickel
Nickel diethyl hexyl acid phosphate complex	NA 928	NA 53	3696	N/A	Inorganic-Nickel
Nickel sulfate (anhydrous)	7786-81-4	50508	NA 420	Fungicide	Inorganic-Nickel
Nickel sulfate hexahydrate	10101-97-0	50505	NA 419	Fungicide	Inorganic-Nickel
Fatty acid* - silver complex *(100% C8)	24927-67-1	72505	NA 675	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Metallic silver	7440-22-4	72501	2125	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver acetate	563-63-3	72507	NA 676	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver carbonate	534-16-7	72509	NA 678	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver chloride	7783-90-6	72506	2324	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver copper zeolite	130328-19-7	#####	NA 110	Microbiocide	Inorganic-Silver, Heavy metal, Inorganic-Copper
Silver fluoride	7775-41-9	72502	NA 674	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver iodide, colloidal	7783-96-2	NA 124	1556	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver nitrate	7761-88-8	72503	2856	Microbiocide, Fungicide, Herbicide, Plant Growth Regulator	Inorganic-Silver, Heavy metal
Silver orthophosphate	7784-09-0	72510	NA 679	Microbiocide,	Inorganic-Silver,

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
(Ag <sub>3</sub> PO <sub>4</sub> )				Fungicide, Herbicide	Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	1301-96-8	#####	NA 111	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver oxide (Ag <sub>4</sub> O <sub>4</sub> )	155645-89-9	#####	NA 111	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver sodium hydrogen zirconium phosphate (Ag <sub>0.18</sub> Na <sub>0.57</sub> H <sub>0.25</sub> Zr <sub>2</sub> (PO <sub>4</sub> ) <sub>3</sub> )	NA 1166	72560	NA 164	Microbiocide	Inorganic-Silver, Heavy metal
Silver thiocyanate	1701-93-5	68203	NA 606	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver thiuronium acrylate co-polymer	53404-00-5	72701	NA 681	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Silver zeolite	130328-18-6	#####	NA 125	Microbiocide	Inorganic-Silver, Heavy metal
Silver zinc zeolite	130328-20-0	#####	NA 111	Microbiocide	Inorganic-Silver, Inorganic-Zinc, Heavy metal
Silver, ionic	14701-21-4	NA 169	5150	Microbiocide, Fungicide, Herbicide	Inorganic-Silver, Heavy metal
Sodium silver thiosulfate	NA 1398	NA 197	NA 196	Herbicide	Inorganic-Silver, Heavy metal
2-Mercaptobenzothiazole, zinc salt	155-04-4	51705	1449	Fungicide, Microbiocide	Mercaptobenzothiazole, Inorganic-Zinc
5-Chloro-2-mercaptobenzothiazole, zinc salt	53404-93-6	51709	NA 427	Microbiocide, Fungicide	Mercaptobenzothiazole, Inorganic-Zinc
Boric acid(H <sub>4</sub> B <sub>6</sub> O <sub>11</sub> ), zinc salt(1:2)	12447-61-9	#####	5094	Fungicide	Inorganic-Zinc
Calcium-zinc LN 193 (complex)	NA 653	NA 120	3871	N/A	Inorganic-Zinc
Chromated zinc chloride	NA 1026	87801	1187	Insecticide, Herbicide, Microbiocide	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
Copper-zinc chromate complex	1344-74-7	21003	163	Fungicide, Wood Preservative	Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal, Inorganic-Copper
Copper-zinc sulfate complex	55072-57-6	8102	164	Fungicide	Inorganic-Zinc, Inorganic-Copper
Copper-zinc sulfate complex, monohydrate	NA 959	NA 382	1751	Fungicide	Inorganic-Zinc, Inorganic-Copper
Crag turf fungicide 531 (Cd-Cu-Ca-Zn-Chromate)	12001-20-6	21006	NA 171	Fungicide	Inorganic-Cadmium, Inorganic-Chromium(VI), Inorganic-Zinc, Heavy metal
EDTA, disodium zinc salt	14025-21-9	NA 274	3189	N/A	Inorganic-Zinc
Lignin sulfonic acid, zinc salt	NA 1014	NA 102	1768	N/A	Inorganic-Zinc

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Lignin sulfonic acid, zinc, manganese & iron salts	NA 1030	NA 126	1771	N/A	Inorganic-Zinc
Mancozeb	2233100	14504	211	Fungicide	Dithiocarbamate, Inorganic-Zinc
Metiram	9006-42-2	14601	493	Fungicide	Dithiocarbamate, Inorganic-Zinc
o-Phenylphenol, alkyl* amine - zinc salt of *(100% C18)	82010-74-0	64107	NA 533	Microbiocide	Phenols, Inorganic-Zinc
Pentachlorophenol, zinc salt	2917-32-0	63008	NA 510	Wood Preservative, Microbiocide, Algicide, Fungicide	Chlorinated Phenol, Inorganic-Zinc
Polyoxin D zinc salt	146659-78-1	#####	NA 129	Fungicide	Inorganic-Zinc
Propineb	12071-83-9	#####	NA 155	Fungicide, Microbiocide	Dithiocarbamate, Inorganic-Zinc
Silver zinc zeolite	130328-20-0	#####	NA 111	Microbiocide	Inorganic-Silver, Inorganic-Zinc, Heavy metal
Zinc	7440-66-6	#####	2310	Herbicide	Inorganic-Zinc
Zinc 2,4,5-trichlorophenate	136-24-3	64221	NA 546	N/A	Chlorinated Phenol, Inorganic-Zinc
Zinc 2-ethyl hexoate	136-53-8	41203	3509	N/A	Inorganic-Zinc
Zinc 2-pyridinethiol-1-oxide	13463-41-7	88002	2128	Microbiocide	Inorganic-Zinc
Zinc 8-quinolinolate	13978-85-3	24005	NA 196	Fungicide, Microbiocide	Inorganic-Zinc
Zinc abietate	6798-76-1	NA 112	3506	N/A	Inorganic-Zinc
Zinc arsenate	13464-44-3	13301	NA 125	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Heavy metal, Inorganic-Zinc
Zinc arsenite	28837-97-0	13604	NA 130	Herbicide, Insecticide, Rodenticide	Inorganic-Arsenic, Inorganic-Zinc, Heavy metal
Zinc bacitracin	1405-89-6	6309	NA 87	Microbiocide	Inorganic-Zinc
Zinc carbonate	3486-35-9	NA 102	3507	N/A	Inorganic-Zinc
Zinc chloride	7646-85-7	87801	624	Microbiocide	Inorganic-Zinc
Zinc dehydroabietyl ammonium 2-ethylhexanoate	53404-92-5	4211	NA 75	Fungicide, Microbiocide	Inorganic-Zinc
Zinc dodecyl benzene sulfonate	12068-16-5	NA 112	3508	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap, Inorganic-Zinc
Zinc fluosilicate	16871-71-9	75307	1019	Insecticide	Inorganic-Zinc
Zinc formate	557-41-5	87802	NA 838	N/A	Inorganic-Zinc
Zinc hydroxide	20427-58-1	88501	3510	N/A	Inorganic-Zinc
Zinc isodecanoate	30304-30-4	41222	NA 355	N/A	Inorganic-Zinc
Zinc isononanoate	5398-80-6	41212	NA 353	N/A	Inorganic-Zinc
Zinc isooctanoate	84082-93-9	41205	NA 351	N/A	Inorganic-Zinc
Zinc mercury chromate	22323-45-1	21004	NA 170	Fungicide	Inorganic-Mercury, Inorganic-chromium(VI), Inorganic-Zinc, Heavy metal
Zinc naphthenate	12001-85-3	88301	1111	Wood Preservative, Insecticide,	Inorganic-Zinc

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				Fungicide, Dog and Cat Repellent	
Zinc neodecanoate	27253-29-8	97502	NA 853	N/A	Inorganic-Zinc
Zinc oxide	1314-13-2	88502	666	Fungicide, Adjuvant	Inorganic-Zinc
Zinc petroleum (C20-C30)sulfonate	68989-17-3	88503	NA 841	N/A	Inorganic-Zinc
Zinc phenol sulfonate	127-82-2	89002	NA 842	N/A	Inorganic-Zinc
Zinc phosphide	1314-84-7	88601	626	Rodenticide	Inorganic-Zinc
Zinc resinate	9010-69-9	77001	NA 712	N/A	Inorganic-Zinc
Zinc silicate	NA 1318	8103	NA 176	Microbiocide	Inorganic-Zinc
Zinc stearate	557-05-1	77002	3511	N/A	Inorganic-Zinc
Zinc sulfate	7733-02-0	89001	667	Microbiocide, Herbicide	Inorganic-Zinc
Zinc sulfate, anhydrous	7733-02-0	89001	1852	Microbiocide, Herbicide	Inorganic-Zinc
Zinc sulfate, basic	68813-94-5	89101	NA 843	N/A	Inorganic-Zinc
Zinc sulfate, monohydrate	7446-19-7	#####	2995	Herbicide	Inorganic-Zinc
Zinc trichlorophenate	30143-22-7	64213	NA 543	Microbiocide	Chlorinated Phenol, Inorganic-Zinc
Zineb	12122-67-7	14506	627	Fungicide	Dithiocarbamate, Inorganic-Zinc
Zineb-ethylene thiuram disulfide adduct	NA 1465	NA 217	NA 216	Fungicide	Dithiocarbamate, Inorganic-Zinc
Ziram	137-30-4	34805	629	Fungicide, Microbiocide, Dog and Cat Repellent	Dithiocarbamate, Inorganic-Zinc
Ziram, cyclohexylamine complex	16509-79-8	34806	1328	Dog and Cat Repellent, Fungicide	Dithiocarbamate, Inorganic-Zinc
1-butoxy ethoxy-2-propanol	124-16-3	NA 113	3074	N/A	Alcohol/Ether
1-butoxy-2-propanol	5131-86-8	NA 467	3075	Solvent	Alcohol/Ether
1-decanol	112-30-1	79038	1791	Plant Growth Regulator	Alcohol/Ether
1-Heptadecanol	1454-85-9	#####	NA 150	N/A	Alcohol/Ether
1-heptanol	111-70-6	NA 205	3222	N/A	Alcohol/Ether
1-hexanol	111-27-3	79047	3229	N/A	Alcohol/Ether
1-Octanol	111-87-5	79037	NA 733	Plant Growth Regulator, Herbicide	Alcohol/Ether
2,6,8-trimethyl-4-nonanol	123-17-1	NA 144	3303	Adjuvant	Alcohol/Ether
2-(2-Butoxyethoxy)ethanol	112-34-5	11502	NA 117	Solvent	Alcohol/Ether, Glycol Ether
2-butoxyethanol	111-76-2	11501	89	Fungicide, Microbiocide, Solvent	Alcohol/Ether
2-ethoxyethanol	110-80-5	NA 104	2554	Fungicide, Microbiocide	Alcohol/Ether
2-Ethyl-1-butanol	97-95-0	#####	NA 148	N/A	Alcohol/Ether
2-ethyl-1-hexanol	10-47-6	NA 251	2560	N/A	Alcohol/Ether
2-Ethyl-1-hexanol	104-76-7	79098	NA 767	Solvent	Alcohol/Ether
2-Phenylcyclohexanol	1444-64-0	65002	NA 550	N/A	Alcohol/Ether
2-Phenylethanol	60-12-8	1503	NA 62	N/A	Alcohol/Ether



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3,3,5-trimethyl cyclohexanol	116-02-9	NA 982	3493	N/A	Alcohol/Ether
3-phenoxybenzyl alcohol	13826-35-2	NA 651	2771	N/A	Alcohol/Ether
4-Methyl-2-pentanol	108-11-2	#####	NA 157	N/A	Alcohol/Ether
Alcohols, C4-C12, normal	NA 392	NA 713	2067	Solvent, Microbiocide	Alcohol/Ether
Alcohols, C6-12	68603-15-6	79029	5072	Microbiocide, Solvent	Alcohol/Ether
Alcohols, C8-10	85566-12-7	79059	5073	Microbiocide, Solvent	Alcohol/Ether
Alkanols (ave. C6), mixed	NA 394	NA 716	1536	Adjuvant	Alcohol/Ether
Alkylaryl polyether alcohol	NA 657	NA 121	878	Adjuvant	Alcohol/Ether
Allyl alcohol	107-18-6	68401	3023	Herbicide	Alcohol/Ether
Benzyl alcohol	100-51-6	9502	915	Insecticide, Fungicide	Alcohol/Ether
Butyl alcohol	78-92-2	1502	1482	Solvent	Alcohol/Ether
Cetyl alcohol	36653-82-4	1508	2449	N/A	Alcohol/Ether
Cinnamyl alcohol	104-54-1	40512	NA 343	Insecticide	Alcohol/Ether
Cyclobutaneethanol, 1-methyl-2-(1-methylethenyl)-, cis-	30820-22-5	#####	NA 922	N/A	Alcohol/Ether
Cyclohexanol	108-93-0	25904	3121	Solvent	Alcohol/Ether
Denatured ethanol	NA 1033	NA 129	2102	Solvent	Alcohol/Ether
Dimethyl ether	115-10-6	NA 132	2517	Solvent	Alcohol/Ether
Ethyl alcohol	64-17-5	1501	8	Microbiocide, Solvent, Adjuvant, Molluscicide	Alcohol/Ether
Ethylene oxide	75-21-8	42301	277	Fumigant	Alcohol/Ether
Fatty alcohols (100% C4-C10)	NA 126	NA 241	3654	Adjuvant	Alcohol/Ether
Fatty alcohols (55.10% C10, 42.88% C8, 1.01% C6, 1.01% C12)	NA 1265	79089	NA 173	Plant Growth Regulator, Adjuvant	Alcohol/Ether
Fatty alcohols (65% C12, 26% C14, 8% C16, 1% C10)	67762-41-8	79056	NA 744	Adjuvant	Alcohol/Ether
Hydrocinnamyl alcohol	122-97-4	40511	NA 342	N/A	Alcohol/Ether
i-Nonyl alcohol	3452-97-9	#####	NA 153	N/A	Alcohol/Ether
Isobutyl alcohol	78-83-1	1507	2622	Solvent	Alcohol/Ether
Isodecyl alcohol	25339-17-7	NA 168	3242	Solvent	Alcohol/Ether
Isopropyl alcohol	67-63-0	47501	342	Microbiocide, Solvent	Alcohol/Ether
Isostearyl alcohol	27458-93-1	NA 156	2627	Adjuvant	Alcohol/Ether
Lauryl alcohol	112-53-8	1509	2343	Pheromone, Adjuvant	Pheromone, Alcohol/Ether
Methanol	67-56-1	53801	1018	Solvent, Adjuvant, Microbiocide	Alcohol/Ether
Methoxypropanol	107-98-2	NA 90	2675	Solvent	Alcohol/Ether
Myristyl alcohol	112-72-1	1510	2344	Pheromone, Fragrance	Alcohol/Ether
n-Butyl alcohol	71-36-3	NA 468	3077	Solvent	Alcohol/Ether
n-Decyl alcohol	112-30-1	79038	3124	Plant Growth Regulator	Alcohol/Ether
n-Propoxy propanol	30136-13-1	NA 798	2837	Solvent	Alcohol/Ether
n-Propyl alcohol	71-23-8	47502	1603	Solvent	Alcohol/Ether
Oleyl alcohol	143-28-2	NA 9	3313	Adjuvant	Alcohol/Ether
Propargyl alcohol	107-19-7	68702	NA 609	Breakdown	Alcohol/Ether

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				product	
Propylene oxide	75-56-9	42501	508	Fumigant	Alcohol/Ether
sec-Butanol	75-65-0	1505	NA 64	Solvent	Alcohol/Ether
Sec-butyl alcohol	78-92-2	1502	3078	Solvent	Alcohol/Ether
Stearyl alcohol	112-92-5	NA 110	2892	Adjuvant	Alcohol/Ether
Tetrahydro furfuryl alcohol	97-99-4	NA 945	3471	Solvent	Alcohol/Ether
(2-Hydroxyethyl)ethylenediamine triacetic acid	150-39-0	39108	NA 330	Adjuvant	Chelating agent
Dimethamine EDTA	NA 167	NA 319	3159	Adjuvant	Chelating agent
EDTA	60-00-4	39101	1702	Adjuvant	Chelating agent
EDTA, ammonium salt	7379-26-2	39117	889	Adjuvant	Chelating agent
EDTA, diethanolamine salt	68133-37-9	NA 273	3187	Adjuvant	Chelating agent
EDTA, disodium salt	139-33-3	39115	2101	Herbicide, Adjuvant	Chelating agent
EDTA, disodium salt	139-33-3	39115	954	Herbicide, Adjuvant	Chelating agent
EDTA, iron chelate	NA 890	NA 170	3240	Herbicide	Chelating agent
EDTA, monoethanolamine salt	7379-26-2	39117	2013	Adjuvant	Chelating agent
EDTA, monopotassium salt	7379-27-3	39111	NA 331	Adjuvant	Chelating agent
EDTA, potassium salt	NA 891	NA 170	3350	Adjuvant	Chelating agent
EDTA, sodium salt	17421-79-3	39103	1757	Adjuvant	Chelating agent
EDTA, tetrapotassium salt	5964-35-2	39118	1054	Adjuvant	Chelating agent
EDTA, tetrasodium salt	64-02-8	39107	759	Adjuvant	Chelating agent
EDTA, trisodium salt	150-38-9	39110	953	Adjuvant	Chelating agent
Ethanolamine ethylenediaminetetraacetate	63517-71-5	39116	NA 334	Adjuvant, Fungicide	Chelating agent
N-(2-hydroxyethyl) ethylene diamine triacetic acid, trisodium salt	139-89-9	39109	911	Microbiocide, Adjuvant	Chelating agent
Nitrilotriacetic acid	139-13-9	NA 228	NA 228	Adjuvant	Chelating agent
Nitrilotriacetic acid, sodium salt	10042-84-9	#####	NA 121	Adjuvant	Chelating agent
Sodium N-(2-hydroxyethyl)ethylenediaminetriacetate	53404-54-9	39121	NA 335	Adjuvant	Chelating agent
Tetra(monoethanolamine) ethylenediaminetetraacetate	53404-52-7	39112	NA 332	Adjuvant, Adjuvant	Chelating agent
Triethylamine EDTA	NA 790	NA 146	3486	Adjuvant	Chelating agent
Triethylamine nitrilo triacetate	NA 537	NA 978	3487	Adjuvant	Chelating agent
Tripotassium ethylenediaminetetraacetate	17572-97-3	39113	1177	Adjuvant	Chelating agent
Trisodium nitrilo triacetate	5064-31-3	39106	1121	Adjuvant	Chelating agent
2,4,5-T, butoxyethanol ester	2545-59-7	82053	819	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
2,4-D, butoxyethanol ester	1929-73-3	30053	802	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
2-(2-Butoxyethoxy)ethanol	112-34-5	11502	NA 117	Solvent	Alcohol/Ether, Glycol Ether
4-(2,4-DB), butoxyethanol ester	32357-46-3	30853	837	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
Alkylaryl polyglycol ether	NA 319	NA 599	1264	Adjuvant	Polyalkyloxy Compound, Glycol Ether
Cinoxate	104-28-9	76604	NA 706	N/A	Glycol Ether

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Dichlorprop, butoxyethanol ester	53404-31-2	31453	923	Plant Growth Regulator, Herbicide	Chlorophenoxy acid or ester, Glycol Ether
Diethylene glycol monoethyl ether	111-90-0	11504	2505	Adjuvant, Solvent	Glycol Ether
Diethylene glycol monomethyl ether	111-77-3	42204	2506	Adjuvant, Solvent	Glycol Ether
Ethoxyethoxyethyl 2,4-dichlorophenoxyacetate	53404-36-7	30058	NA 245	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
Ethyl amino benzoate	111-15-9	NA 260	3192	N/A	Glycol Ether
Ethylene glycol, mono-butyl ether	111-76-2	11501	1880	Solvent, Adjuvant	Glycol Ether
Haloxypop-ethyl (unstated stereochemistry)	87237-48-7	NA 200	NA 199	Herbicide	Aryloxyphenoxy propionic acid, Glycol Ether
MCPA, butoxyethanol ester	19480-43-4	30553	785	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
Silvex, butoxyethanol ester	19398-13-1	82553	828	Herbicide	Chlorophenoxy acid or ester, Glycol Ether
Triclopyr, butoxyethyl ester	64700-56-7	#####	2170	Herbicide	Chloropyridinyl, Glycol Ether
(Decyl oxy) poly (oxy ethylene) poly (oxy propylene)	9038-29-3	NA 117	3636	Adjuvant	Polyalkyloxy Compound
(Octyl oxy) poly (oxyethylene) poly (oxypropylene)	61827-84-7	NA 102	3707	Adjuvant	Polyalkyloxy Compound
2,6,8-trimethyl-4-nonyloxy polyethylene oxyethanol	NA 1162	NA 175	5599	Adjuvant	Polyalkyloxy Compound
4-nonyl phenoxy poly (ethylene oxy) ethyl phosphate, magnesium salt	NA 805	NA 149	3698	Soap/Surfactant, Adjuvant	Polyalkyloxy Compound
a-(p-nonylphenyl)-omega-hydroxypoly (oxyethylene) with an average of 4.2 moles of ethylene oxide.the nonly group is a propylene	NA 27	NA 40	2066	Microbiocide	Polyalkyloxy Compound
a-(p-nonylphenyl)-omega-hydroxypoly (oxyethylene) with an average of 9-10 moles of ethylene oxide	NA 28	NA 41	2052	Microbiocide	Polyalkyloxy Compound
Alkenoic acid poly oxyalkylene ether & alkyl poly oxyalkylene ether	NA 396	NA 718	2364	Adjuvant	Polyalkyloxy Compound
Alkoxy poly (ethyleneoxy) ethyl phosphate	NA 286	NA 555	1390	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkyl (100% C10-C13) oxy poly (ethylene oxy) ethyl phosphate, mono-	NA 288	NA 560	3575	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkyl (100% C10-C14) oxy poly (ethylene oxy) ethyl phosphate	68585-36-4	NA 579	3574	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkyl (100% C11-C15) phenoxy poly (ethylene oxy) ethanol	68131-40-8	79084	3572	Insecticide, Fungicide, Avicide, Adjuvant	Polyalkyloxy Compound
Alkyl (C8,C10) polyglycoside	68515-73-1	NA 154	4015	Adjuvant	Polyalkyloxy Compound

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Alkyl and alkylaryl poly (oxyethylene) glycols, mixed	NA 398	NA 720	1706	Adjuvant	Polyalkyloxy Compound
Alkyl aryl alkoxylate	NA 314	NA 594	2366	Adjuvant	Polyalkyloxy Compound
Alkyl aryl polyoxyalkane ether and free fatty acids	NA 323	NA 603	2370	Adjuvant	Polyalkyloxy Compound
Alkyl oxy poly (ethyleneoxy) ethyl phosphate	NA 679	NA 125	1715	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkyl oxy polyethoxy ethanol	NA 306	NA 578	2048	Adjuvant	Polyalkyloxy Compound
Alkyl oxy-polyoxyethylene and alkyl phenyloxy-polyoxyethylene	NA 289	NA 561	2136	Adjuvant	Polyalkyloxy Compound
Alkyl phenoxy poly (ethoxy) ethanol	NA 291	NA 563	1173	Adjuvant	Polyalkyloxy Compound
Alkyl phenyl poly (ethoxy) ethanol	NA 294	NA 566	1064	Adjuvant	Polyalkyloxy Compound
Alkyl polyethylene glycol ether	NA 668	NA 123	1376	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkyl polyoxy alkylene ether	NA 295	NA 567	2123	Adjuvant	Polyalkyloxy Compound
Alkyl polyoxy ethylene ether, diphosphoric acid ester	NA 592	NA 107	2014	Adjuvant	Polyalkyloxy Compound
Alkyl polyoxy ethylene ether, free fatty acids	NA 296	NA 568	2377	Adjuvant	Polyalkyloxy Compound
Alkyl polyoxy ethylene ether, monophosphoric acid ester	NA 694	NA 127	2015	Adjuvant	Polyalkyloxy Compound
Alkyl polyoxy ethylene ethers, polymerized resins and fatty acids	NA 297	NA 569	2158	Adjuvant	Polyalkyloxy Compound
Alkyl polyoxy ethylene glycols	NA 285	NA 554	2051	Adjuvant	Polyalkyloxy Compound
Alkylaryl hydroxypoly (oxyethylene) ethanol	NA 316	NA 596	2037	Adjuvant	Polyalkyloxy Compound
Alkylaryl poly(oxyethylene) glycol	NA 315	NA 595	748	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyalkoxylated alcohols	NA 705	NA 129	2174	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyethoxy ethanol phosphate	NA 714	NA 130	2368	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkylaryl polyethoxyethanol sulfates	NA 912	NA 174	5323	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyethylene glycol ether	NA 318	NA 598	2198	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkylaryl polyglycol ester	NA 1470	NA 218	NA 218	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyglycol ether	NA 319	NA 599	1264	Adjuvant	Polyalkyloxy Compound, Glycol Ether
Alkylaryl polyoxy glycol	NA 322	NA 602	2369	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyoxyethylene ether	NA 320	NA 600	881	Adjuvant	Polyalkyloxy Compound
Alkylaryl polyoxyethylene glycol phosphate ester	NA 321	NA 601	2024	Adjuvant, Soap/Surfactant	Polyalkyloxy Compound
Alkylaryl polyoxyethylene	NA 671	NA 124	1507	Adjuvant	Polyalkyloxy

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ethanol					Compound
Alkylpoly glycol ether	NA 292	NA 564	1172	Adjuvant	Polyalkyloxy Compound
Allyl oxy poly ethylene glycol monoallyl acetate	NA 279	NA 545	2376	N/A	Polyalkyloxy Compound
Alpha (para-tert-butyl phenyl)-omega-hydroxypoly (oxyethylene)-	NA 235	NA 463	1605	Adjuvant	Polyalkyloxy Compound
Alpha (para-tert-butylphenyl)-omega-hydroxypoly (oxyethylene)	NA 234	NA 462	1786	Adjuvant	Polyalkyloxy Compound
Alpha-(omega-sec-butyl phenylpoly (oxypropylene))-omega-hydroxypoly	NA 231	NA 452	1885	Adjuvant	Polyalkyloxy Compound
Alpha-(p-(1,1,3,3-tetramethyl butyl) phenyl)-omega-hydroxy poly	NA 609	NA 111	1932	Adjuvant	Polyalkyloxy Compound
Alpha-(p-nonylphenyl)-omega-hydroxy poly (oxypropylene)	NA 745	NA 135	2710	Adjuvant	Polyalkyloxy Compound
Alpha-(para-nonyl phenyl)-omega-hydroxy poly (oxyethylene)	NA 18	NA 31	1649	Adjuvant	Polyalkyloxy Compound
Alpha-alkyl (43%C10, 30%C14, 12%C12, 10%C16, 5%C18) poly (oxyethylene) poly (oxypropylene) - I2 complex	NA 684	NA 126	1834	Microbiocide	Polyalkyloxy Compound
Alpha-alkyl (C10-C12)-omega-hydroxypoly (oxyethylene)	NA 307	NA 582	2077	Adjuvant	Polyalkyloxy Compound
Alpha-alkyl (C10-C18)-omega-hydroxypoly (oxyethylene) sulfate	NA 301	NA 573	1700	Adjuvant	Polyalkyloxy Compound
150 solvent neutral BP 901 base oil	NA 747	NA 136	2724	Insecticide	Petroleum derivative
Alkylated aromatic petroleum oil	68919-17-5	54001	NA 451	Insecticide, Adjuvant	Petroleum derivative
Amoco 6342	NA 715	NA 131	2384	N/A	Petroleum derivative
Anthracene oil	120-12-7	NA 185	NA 184	Insecticide, Herbicide, Rodenticide	Petroleum derivative
Aromatic 100	NA 269	NA 524	2394	Insecticide, Solvent	Petroleum derivative
Aromatic 150	NA 716	NA 131	2395	Insecticide, Solvent	Petroleum derivative
Aromatic 200	64742-94-5	6602	2396	Insecticide, Solvent	Petroleum derivative
Asphalt solids	8052-42-4	22001	1140	Pruning Aid	Petroleum derivative
Bitumen	8052-42-4	22002	NA 171	N/A	Petroleum derivative
Candle wax	NA 227	NA 440	2443	N/A	Petroleum derivative
Chevron 100 neutral oil	68602-80-2	6601	2456	Insecticide	Petroleum derivative
Chevron base oil "C"	NA 224	NA 431	2455	Insecticide	Petroleum derivative
Chevron solvent 425	NA 722	NA 132	2457	Solvent	Petroleum derivative
Coal tar distillate boiling between 270-300 deg C	65996-91-0	6101	5042	Insecticide, Herbicide	Petroleum derivative
Coal tar hydrocarbons	8007-45-2	22003	1719	Wood Preservative	Petroleum derivative

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Coal tar neutral oils and coal tar acid combinations	65996-82-9	25001	144	Insecticide, Herbicide	Petroleum derivative
Coal tar phenols	1319-77-3	22101	1720	N/A	Petroleum derivative, Phenols
Coal tar pitch >351 deg.C(AWPI)	65996-93-2	#####	NA 106	Insecticide	Petroleum derivative
Conoco LPA	NA 195	NA 386	2478	N/A	Petroleum derivative
Creosote	8001-58-9	25004	171	Wood Preservative	Petroleum derivative
Creosote oil (note: derived from any source)	61789-28-4	25003	NA 203	Wood Preservative, Fungicide	Petroleum derivative
Cumene	98-82-8	NA 105	3116	N/A	Petroleum derivative
Cyclohexane	110-82-7	25901	2087	Solvent	Petroleum derivative
Diesel fuel no. 2	68476-34-6	63514	3923	Insecticide, Adjuvant	Petroleum derivative
Ethyl benzene	100-41-4	NA 142	3197	N/A	Petroleum derivative
Ethylene	74-85-1	41901	270	Plant Growth Regulator	Petroleum derivative
Fuel oil #1	70892-10-3	63511	NA 520	N/A	Petroleum derivative
Fuel oil #2	68476-30-2	63505	NA 517	N/A	Petroleum derivative
Fuel oil #4	68476-31-3	63512	NA 521	N/A	Petroleum derivative
Fuel oil #6	68553-00-4	63513	NA 522	N/A	Petroleum derivative
Gasoline	NA 945	NA 221	1899	N/A	Petroleum derivative
Heavy oil (coal) 301-350 deg.C (AWPI)	90640-86-1	#####	NA 106	N/A	Petroleum derivative
Hydrotreated paraffinic solvent	NA 91	NA 182	2601	Solvent	Petroleum derivative
Isobutane	75-28-5	97101	2621	Propellant	Petroleum derivative
Isoparaffin, C11-C12	NA 85	NA 163	2623	N/A	Petroleum derivative
Isoparaffin, C12-C14	NA 86	NA 164	2624	N/A	Petroleum derivative
Isoparaffinic hydrocarbons	64771-72-8	#####	1641	N/A	Petroleum derivative
Isopentane	78-78-4	NA 165	3244	Solvent	Petroleum derivative
Jet fuel	94114-58-6	63515	NA 523	Insecticide, Solvent	Petroleum derivative
Kerosene	8008-20-6	63501	2071	Insecticide	Petroleum derivative
KM spray oil	NA 78	NA 150	2631	N/A	Petroleum derivative
Ligroin	8032-32-4	63506	2642	Solvent	Petroleum derivative
Low molecular weight paraffinic oil	64642-47-8	NA 173	5252	Insecticide	Petroleum derivative
MCIAL code 401	64742-55-8	63503	2045	Insecticide, Adjuvant	Petroleum derivative
Mineral oil	8012-95-1	63502	401	Insecticide, Adjuvant	Petroleum derivative
Mineral oil, petroleum distillates, solvent refined light	64741-89-5	63503	3846	Herbicide, Plant Growth Regulator, Insecticide, Adjuvant	Petroleum derivative
Mineral oil, petroleum extract, heavy paraffinic distillate	64724-04-7	NA 171	3847	Insecticide, Adjuvant	Petroleum derivative
Mineral seal oil	NA 930	NA 67	2687	Insecticide, Adjuvant	Petroleum derivative
Mineral spirits	8032-32-4	63506	2688	Insecticide, Solvent, Fungicide	Petroleum derivative

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
n-Hexane	110-54-3	NA 103	3227	Solvent	Petroleum derivative
Naphtha, heavy aromatic	64742-94-5	6602	1717	Insecticide, Solvent	Petroleum derivative
Orchex 796 oil	NA 899	NA 172	5179	Insecticide, Adjuvant	Petroleum derivative
Paraffin wax	8002-74-2	NA 107	1214	Rodenticide	Petroleum derivative
Paraffin waxes (petroleum) hydrotreated	64742-51-4	NA 694	3545	N/A	Petroleum derivative
Paraffin waxes and hydrocarbon waxes, chlorinated	61788-76-9	NA 693	3721	N/A	Petroleum derivative
Pentane	109-66-0	98001	469	Solvent	Petroleum derivative
Petroleum derivative resin	64742-16-1	11401	1411	N/A	Petroleum derivative
Petroleum distillates	2227378	63503	763	Insecticide	Petroleum derivative
Petroleum distillates, aliphatic	2227378	63503	2768	Insecticide, Adjuvant, Solvent	Petroleum derivative
Petroleum distillates, aromatic	68477-31-6	6501	1814	Solvent, Herbicide, Insecticide	Petroleum derivative
Petroleum distillates, refined	64741-51-1	NA 654	2106	Insecticide	Petroleum derivative
Petroleum hydrocarbons	8012-95-1	63502	473	Insecticide, Solvent	Petroleum derivative
Petroleum jelly	2229873	#####	1443	Insect Repellent, Adjuvant	Petroleum derivative
Petroleum naphthenic oils	NA 990	NA 655	2107	Insecticide, Adjuvant	Petroleum derivative
Petroleum oil, unclassified	68815-10-1	NA 121	765	Insecticide, Herbicide, Fungicide, Adjuvant	Petroleum derivative
Petroleum sulfonates	61789-85-3	#####	766	N/A	Petroleum derivative
Petroleum, unrefined	2227378	63503	1730	Insecticide, Adjuvant	Petroleum derivative
Polybutenes	9003-29-6	11402	1040	Rodenticide	Petroleum derivative
Polyisobutylene	9003-27-4	11403	1561	Rodenticide	Petroleum derivative
Propane	74-98-6	NA 109	2832	Propellant	Petroleum derivative
Propylene	1150-70-1	NA 800	2838	N/A	Petroleum derivative
Solvent naphtha (coal), 150-200 deg. C	65996-79-4	#####	NA 106	Solvent	Petroleum derivative
Solvent naphtha (petroleum), light aromatic	64742-95-6	86803	3804	Solvent	Petroleum derivative
Summer oil	NA 1468	NA 218	NA 218	Insecticide, Adjuvant	Petroleum derivative
Sun superior spray oil 7N	NA 769	NA 139	2902	Insecticide, Adjuvant	Petroleum derivative
Synthetic beeswax	NA 509	NA 920	2910	N/A	Petroleum derivative
Tar	NA 1312	22004	NA 176	Wood Preservative	Petroleum derivative
Tar acid oil	NA 1041	NA 139	2914	Insecticide	Petroleum derivative
Toluene	108-88-3	80601	1281	Solvent	Petroleum derivative
Turpentine	8006-64-2	84501	605	Insecticide, Adjuvant	Petroleum derivative
White mineral oil	8042-47-5	63510	NA 519	Insecticide, Adjuvant	Petroleum derivative

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Winter oil	NA 1472	NA 219	NA 218	Adjuvant	Petroleum derivative
Xylene	1330-20-7	86802	622	Solvent, Microbiocide	Petroleum derivative
Xylene range aromatic solvent	68920-06-9	NA 102	862	Solvent, Insecticide	Petroleum derivative
3-(3-hydroxypropyl)-hepta- methyl trisiloxane, ethoxylated, acetate	NA 90	NA 178	2610	Adjuvant	Silicone
Compounded silicone	NA 703	NA 129	2124	Adjuvant	Silicone
Dimethyl poly siloxane	63148-62-9	NA 104	1861	Insecticide, Adjuvant	Silicone
Dimethyl silicone fluid emulsion	NA 696	NA 128	2028	Adjuvant	Silicone
Dow Corning antifoam Y-30 emulsion	NA 146	NA 280	2539	Adjuvant	Silicone
Dow Corning DB-110A- antifoam emulsion	NA 577	NA 104	2540	Adjuvant	Silicone
Heptamethyltrisiloxane ethoxylated (8 EO)	67674-67-3	NA 153	4009	Adjuvant	Silicone
Methyl silicone resins	9016-00-6	NA 77	3689	Adjuvant	Silicone
Methylated silica	67762-90-7	NA 173	5292	N/A	Silicone
Organo/modified polysiloxane	37281-78-0	NA 153	3997	Adjuvant	Silicone
Organosilicone, poly oxyalkylene ether copolymer	67762-85-0	NA 173	5231	Adjuvant	Silicone
Polyalkene oxide modified heptamethyl trisiloxane	27306-78-1	NA 146	3520	Adjuvant	Silicone
Polyalkyleneoxide modified polydimethyl-siloxane	NA 904	NA 172	5203	Adjuvant	Silicone
Polyether modified polysiloxane	NA 906	NA 172	5223	Adjuvant	Silicone
Polysiloxane	NA 1337	NA 180	5718	Adjuvant	Silicone
Silicone	NA 815	NA 150	3796	Adjuvant	Silicone
Silicone defoamer	NA 462	NA 826	1917	Adjuvant	Silicone
Silicone mold release agent SM 2140	NA 463	NA 827	2854	N/A	Silicone
Silicone-polyether copolymer	27306-78-1	NA 151	3841	Adjuvant	Silicone
Trimethyl siloxy stearate	NA 541	NA 987	2965	N/A	Silicone
1,1,2,3-tetramethyl butylamine dodecyl benzene sulfonate	NA 1010	NA 948	3472	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
1,3-propane diamine dodecyl benzene sulfonate	NA 1021	NA 115	3369	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
2,2-oxybis (4-dodecyl benzene sulfonate)	NA 1161	NA 175	1741	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
2-((2-amino ethyl) amino) ethanol dodecyl benzene sulfonate	68084-55-9	NA 538	3034	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Alkanolamide surfactants	NA 911	NA 174	5322	Soap/Surfactant , Adjuvant	Soap
Alkyl* sodium benzene	68411-30-3	#####	NA 126	Microbiocide,	Soap



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sulfonate *(56%C11, 33%C12, 7%C10, 4%C13)				Adjuvant, Fungicide, Insecticide	
Ammonium lauryl sulfate	2235-54-3	79028	1017	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Ammonium oleate	544-60-5	31703	1230	Adjuvant, Insecticide	Soap
Ammonium tall oil fatty acid soap	544-60-5	31703	995	Adjuvant, Insecticide	Soap
Benzene, 1,1'-oxybis-tetrapropylene derivatives, sulfonated, sodium	119345-04-9	NA 147	3561	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Butylamine dodecyl benzene sulfonate	12068-09-6	NA 469	3079	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Coconut oil soap	NA 199	NA 391	2088	Adjuvant, Insecticide, Soap/Surfactant	Soap
DEA-dodecyl benzene sulfonate	26545-53-9	79015	3123	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Diethylamine salt of coconut fatty acid	NA 210	NA 402	1066	Adjuvant, Soap/Surfactant	Soap
Diisopropylamine dodecyl benzene sulfonate	29061-61-8	NA 327	3156	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Dimethylamine propylamine tridecyl benzene sulfonate	NA 953	NA 318	3162	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Dimethylamine dodecyl benzene sulfonate	NA 954	NA 324	3161	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Disodium 2,2'-oxybis(4-dodecylbenzene)sulfonate	5136-51-6	79003	3175	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Disodium 4-dodecyl-2,4'-oxydibenzene sulfonate	7575-62-4	79002	3172	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Dodecyl alkyl sulfonate	NA 284	NA 553	1599	Adjuvant	Soap
Dodecylbenzene sulfonic acid	27176-87-0	98002	941	Adjuvant, Microbiocide, Insecticide	Soap
Ethylene diamine dodecyl benzene sulfonate	12068-06-3	NA 257	3200	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Fatty acid esters	NA 1358	NA 193	NA 192	Plant Growth	Soap

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				Regulator, Insecticide, Adjuvant	
Free fatty acids and/or amine salts	84776-33-0	31801	1198	Herbicide, Deer Repellent, Fungicide, Insecticide	Soap
Hydrogenated wax, neutral wax and alkali soaps of fatty acids	NA 93	NA 187	1368	Adjuvant, Insecticide	Soap
Isopropylamine dodecylbenzene sulfonate	26264-05-1	79030	3247	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Lauryl sulfate salts	NA 937	NA 137	2637	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Linear alkyl sulfonate, potassium salt	NA 283	NA 552	1836	Adjuvant	Soap
Magnesium lauryl sulfate	435950	79017	1718	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Mannitan coconut oil ester	26545-55-0	NA 106	3680	Adjuvant, Soap/Surfactant	Soap
Monoethanolamine dodecyl benzene sulfonate	26545-53-9	79015	1890	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
N,N-dimethyl-1,3-propane diamine dodecyl benzene sulfonate	NA 950	NA 305	3168	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Naphthenic soap	61790-13-4	#####	1806	Adjuvant, Insecticide	Soap
Oleic acid, methyl ester	112-62-9	NA 5	2266	Adjuvant	Soap
Oleic acid, potassium salt	143-18-0	79095	865	Adjuvant	Soap
Oleic and linoleic acid, mixed potassium salts	NA 4	NA 6	1807	Adjuvant	Soap
Organic phosphate ester surfactant	NA 1	NA 1	2725	Soap/Surfactant, Adjuvant	Soap
Para-alkyl (C9-C13) benzene sulfonic acid, sodium salt	25155-30-0	79010	1739	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Phenyl 2-trimethylammonium ethanesulfonate methyl sulfate	22232-15-1	#####	NA 125	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Potash fish soap	68154-69-8	79040	496	Adjuvant, Insecticide	Soap
Potash soap	61790-44-1	#####	1596	Herbicide, Insecticide, Adjuvant	Soap
Potassium alkyl benzene sulfonates	27177-77-1	79008	994	Microbiocide, Adjuvant,	Soap

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				Fungicide, Insecticide	
Potassium dodecylbenzene sulfonate	27177-77-1	79008	1027	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Potassium laurate	10124-65-9	79021	901	Adjuvant, Insecticide, Microbiocide, Fungicide, Soap/Surfactant	Soap
Potassium laurate and myristate soaps	NA 999	NA 780	2825	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Potassium laurate, other related	NA 1125	NA 166	90901	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Potassium lauryl sulfate	4706-78-9	NA 781	3353	Adjuvant	Soap
Potassium myristate	13429-27-1	79022	902	Adjuvant	Soap
Potassium soap of coconut fatty acid	10124-65-9	79021	903	Adjuvant, Insecticide, Microbiocide, Fungicide, Soap/Surfactant	Soap
Potassium soap of tall oil fatty acid	10124-65-9	79021	1409	Adjuvant, Insecticide, Fungicide, Microbiocide	Soap
Potassium stearate	593-29-3	NA 784	3361	Adjuvant	Soap
Shampoo base	NA 460	NA 822	3795	Adjuvant	Soap
Soap	68952-95-4	79009	772	Microbiocide, Insecticide, Deer Repellent	Soap
Sodium alkyl* benzene sulfonate *(100% C9)	26856-61-1	79087	NA 760	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium benzene sulfonate	515-42-4	NA 109	974	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium decyl benzene sulfonate	1322-98-1	79088	3394	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium di (1-alkenyl) phenoxy benzene disulfonate	39354-74-0	79060	1373	Adjuvant	Soap
Sodium dodecylbenzene sulfonate	25155-30-0	79010	774	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium laurate	629-25-4	79026	NA 732	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap

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Sodium lauryl ether diglycol sulfate	NA 1471	NA 219	NA 218	Adjuvant	Soap
Sodium lauryl ether sulfate	9004-82-4	79054	3799	Adjuvant, Insecticide, Microbiocide, Fungicide, Soap/Surfactant	Soap
Sodium lauryl sulfate	151-21-3	79011	907	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Sodium methylundecyl benzenesulfonate	27987-00-4	79053	NA 742	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium mono (1-alkenyl) phenoxy benzene disulfonate	39354-74-0	79060	1372	Adjuvant	Soap
Sodium n-decyl sulfate	142-87-0	79077	NA 754	Adjuvant	Soap
Sodium N-methyl-N-oleyl laurate	NA 1004	NA 854	3419	Adjuvant, Insecticide, Microbiocide, Fungicide	Soap
Sodium nonanoyloxybenzene sulfonate	91129-43-8	89053	5137	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium octylbenzene sulfonate	28675-11-8	79057	NA 745	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium tallow soap	NA 473	NA 870	3802	Adjuvant, Insecticide	Soap
Sodium tetradecyl sulfate	1191-50-0	NA 110	3446	Adjuvant	Soap
Sodium tridecylbenzene sulfonate	26248-24-8	79072	NA 752	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium triisopropyl naphthalene sulfonate	1323-19-9	NA 872	3448	Insecticide, Fungicide, Microbiocide, Adjuvant	Soap
Sodium triphenyl benzene sulfonate	NA 1006	NA 873	3449	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sodium xylene sulfonate	1300-72-7	79019	909	Adjuvant	Soap
Sodium-1-octane sulfonate	5324-84-5	NA 859	3886	Adjuvant	Soap
Soybean fatty acids, tert amine salt	NA 480	NA 884	1308	Adjuvant	Soap
Strontium dodecyl benzene sulfonate	12068-15-4	NA 906	3456	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Sulfonated petroleum soap	61789-62-6	79012	NA 729	Adjuvant, Insecticide	Soap
Sulfuric acid, monododecyl	151-21-3	79011	2901	Adjuvant,	Soap

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ester sodium salt				Insecticide, Microbiocide, Fungicide	
Surfactant blend	NA 1515	NA 223	NA 222	Soap/Surfactant , Adjuvant	Soap
Surfactant mixture	NA 1516	NA 223	NA 223	Soap/Surfactant , Adjuvant	Soap
Tallow soap	NA 607	NA 110	1499	Adjuvant, Insecticide	Soap
Triethanolamine dodecylbenzene sulfonate	27323-41-7	79020	984	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap
Zinc dodecyl benzene sulfonate	12068-16-5	NA 112	3508	Microbiocide, Adjuvant, Fungicide, Insecticide	Soap, Inorganic-Zinc
Cane syrup	NA 228	NA 441	3598	N/A	Carbohydrate
Complex carbohydrate polymer derivative	NA 834	NA 154	4027	Adjuvant	Carbohydrate
Corn syrup	NA 580	NA 105	3628	Bait	Carbohydrate
Cornstarch	NA 800	NA 148	3627	N/A	Carbohydrate
Dextrose	50-99-7	NA 360	3129	N/A	Carbohydrate
Fructose	7660-25-5	NA 177	5742	N/A	Carbohydrate
Honey	NA 734	NA 134	2595	N/A	Carbohydrate
Invert sugar	8013-17-0	NA 171	3672	Bait	Carbohydrate
Invert syrup	NA 941	NA 172	3673	Bait	Carbohydrate
Lactose	63-42-3	NA 141	1400	N/A	Carbohydrate
Malt extract	8002-48-0	NA 134	2659	N/A	Carbohydrate
Molasses	NA 40	NA 69	744	Bait	Carbohydrate
Polysaccharide polymer	NA 702	NA 129	2112	Adjuvant	Carbohydrate
Sorbitol	50-70-4	NA 214	1629	N/A	Carbohydrate
Starch	9005-84-9	NA 898	1821	N/A	Carbohydrate
Starch-G-poly (acrylamide-co- sodium acrylate)	NA 494	NA 899	2888	N/A	Carbohydrate
Sugar	57-50-1	23	708	Bait	Carbohydrate
Sweet n' neat 45 spray dried honey powder	NA 634	NA 116	3565	N/A	Carbohydrate
Validamycin	37248-47-8	NA 190	NA 189	Fungicide	Carbohydrate
alpha-Cellulose	NA 1537	NA 225	NA 224	Insecticide	Cellulose derivative
Carbo methoxy ether cellulose, sodium salt	9004-32-4	#####	2446	Insecticide	Cellulose derivative
Cellulose	9004-34-6	NA 432	3100	N/A	Cellulose derivative
Cellulose ethyl hydroxy ethyl ether	9004-58-4	NA 113	3101	N/A	Cellulose derivative
Ethyl cellulose	9004-57-3	NA 264	3652	N/A	Cellulose derivative
Hydroxyethyl cellulose	9004-62-0	46201	1511	N/A	Cellulose derivative
Hydroxypropyl methyl cellulose	9004-65-3	NA 179	1969	N/A	Cellulose derivative
Methyl cellulose	9004-67-5	NA 85	1205	N/A	Cellulose derivative
Microcrystalline cellulose	9004-34-6	NA 63	2686	N/A	Cellulose derivative
Nitrocellulose	9004-70-0	99601	NA 867	N/A	Cellulose derivative
(2- chloroethyl)methylbis(phenylm ethoxy)silane	41289-08-1	#####	NA 101	N/A	Unclassified

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1% verde green solution	NA 553	NA 100	2982	Dye	Unclassified
1,2-dimethyl hydrazine	540-73-0	NA 142	3165	N/A	Unclassified
1,2-epoxy butane	106-88-7	NA 142	3190	N/A	Unclassified
1,3-butadiene	106-99-0	NA 471	2431	N/A	Unclassified
1-((4-methyl-2-nitrophenyl)azo) naphthalenol	NA 43	NA 80	2682	N/A	Unclassified
1-methyl pyrrolidine	120-94-5	NA 75	3287	N/A	Unclassified
1-Pentanethiol	110-66-7	#####	NA 872	N/A	Unclassified
2,2'-octadecyl imino diethanol	10213-78-2	NA 20	3306	N/A	Unclassified
2,2'-oxybis (4,4,6-trimethyl-1,3,2-dioxaborinane)	14697-50-8	12402	792	Microbiocide	Unclassified
2-butanone oxime	96-29-7	NA 474	3071	N/A	Unclassified
2-chloropyridine-N-oxide	NA 219	NA 417	2466	N/A	Unclassified
2-ethyl hexanoic acid	149-57-5	#####	3228	N/A	Unclassified
2-ethyl hexyl acrylate	103-11-7	NA 252	2115	N/A	Unclassified
2-heptanone	110-43-0	NA 206	3223	N/A	Unclassified
2-hydroxy-4-n-octyl benzophenone	NA 572	NA 103	2608	N/A	Unclassified
2-mercapto pyridine	2637-34-5	NA 94	2671	N/A	Unclassified
2-nitro-1-butyl phosphate	57249-19-1	56902	2033	N/A	Unclassified
2-Nitropropane	79-46-9	#####	3301	Impurity	Unclassified
3',6'-Dihydro-2',4',5',7'-tetraiodospiro(isobenzofuran-1(3H),9'-(9H)xanthen)-3-one	15905-32-5	#####	NA 981	Dye	Unclassified
4-hydroxydiphenylamine	122-37-2	NA 217	NA 217	Breakdown product	Unclassified
5-methyl-2-hexanone	110-12-3	NA 81	3230	N/A	Unclassified
Acetaldehyde	75-07-0	#####	3012	N/A	Unclassified
Acetic anhydride	108-24-7	44007	3014	N/A	Unclassified
Acetone	67-64-1	44101	747	Solvent	Unclassified
Acetonitrile	75-05-8	NA 699	3015	Solvent	Unclassified
Acetophenone	98-86-2	#####	2074	N/A	Unclassified
Acid blue 182	NA 599	NA 108	2353	Dye	Unclassified
Acid blue 7	NA 385	NA 702	2352	Dye	Unclassified
Acid blue 9, diammonium salt	2650-18-2	#####	2154	Herbicide, Dye	Unclassified
Acid blue 9, disodium salt	3844-45-9	#####	3562	Herbicide, Dye	Unclassified
Acid yellow 23	1934-21-0	#####	2155	Herbicide, Dye	Unclassified
Acridinic bases	NA 1356	NA 193	NA 192	Repellent	Unclassified
Acrylic acid	79-10-7	NA 129	2118	N/A	Unclassified
AD-67	NA 1378	NA 195	NA 194	Herbicide Safener	Unclassified
Adjuvants	NA 1484	NA 221	NA 220	Adjuvant	Unclassified
Agent 1059-106	NA 388	NA 708	2357	N/A	Unclassified
Agent 1059-108	NA 600	NA 108	2358	N/A	Unclassified
Agent 1315-33A	NA 389	NA 709	3881	N/A	Unclassified
Agent 1315-33N	NA 390	NA 710	3879	N/A	Unclassified
Agent 1594-9	NA 654	NA 120	3880	N/A	Unclassified
Agent 551-85	NA 387	NA 707	2356	N/A	Unclassified
Agent W-218	NA 391	NA 711	2359	N/A	Unclassified
Aldehyde C10	112-31-2	#####	NA 107	N/A	Unclassified
Aldehyde C11	112-44-7	#####	NA 107	N/A	Unclassified
Aldehyde C12	112-54-9	#####	NA 107	N/A	Unclassified
Aldehyde C6	66-25-1	#####	NA 107	N/A	Unclassified
Aldehyde C8	124-13-0	#####	NA 107	N/A	Unclassified

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Aldimorph	NA 1340	NA 188	NA 187	Fungicide	Unclassified
Aliphatic amines	NA 713	NA 130	2362	N/A	Unclassified
Alkanol XC	NA 828	NA 152	3931	Adjuvant	Unclassified
Alkatronic PGP-33-4	NA 395	NA 717	2363	N/A	Unclassified
Alkyl (C9H12) benzenes	NA 310	NA 589	2371	Solvent	Unclassified
Amine 220	21652-27-7	NA 141	3033	N/A	Unclassified
Amines, aliphatic	NA 277	NA 543	1747	N/A	Unclassified
Amino acids	NA 1359	NA 193	NA 192	Plant Growth Regulator	Unclassified
Ammonium propionate	NA 1061	NA 158	5015	Microbiocide, Preservative	Unclassified
Amsco-solv	NA 271	NA 526	2386	Solvent	Unclassified
Amygdalinic acid diethyl amide	NA 1448	NA 215	NA 214	Insect Repellent	Unclassified
Amyl acetate	628-63-7	169	1889	N/A	Unclassified
Aniline	62-53-3	#####	3056	N/A	Unclassified
Anionic wax emulsion	61789-97-7	NA 515	3818	N/A	Unclassified
Anionic wax emulsion	NA 892	NA 171	3848	N/A	Unclassified
Aquashade	92170-50-8	#####	NA 909	Herbicide, Dye	Unclassified
Armul 1426	NA 267	NA 522	3878	N/A	Unclassified
Armul 1426 HF	NA 822	NA 151	3877	N/A	Unclassified
Armul 1427	NA 268	NA 523	3883	N/A	Unclassified
Armul 1427 HF	NA 589	NA 106	3876	N/A	Unclassified
Armul 214/215	NA 265	NA 520	2391	N/A	Unclassified
Armul 22	NA 263	NA 518	2389	N/A	Unclassified
Armul 33	NA 587	NA 106	2390	N/A	Unclassified
Armul 358	NA 266	NA 521	2392	N/A	Unclassified
Armul 646	NA 588	NA 106	2393	N/A	Unclassified
Armul 88	NA 264	NA 519	3908	N/A	Unclassified
Artificial peanut butter flavor wl-5344	NA 717	NA 131	2397	N/A	Unclassified
Astrazon yellow 4g200	NA 258	NA 511	2399	Dye	Unclassified
Atlox 1045A	61723-83-9	NA 152	3911	N/A	Unclassified
Atplus 300F	NA 255	NA 507	3916	N/A	Unclassified
b-Bromo-b-nitrostyrene	7166-19-0	NA 221	NA 221	Microbiocide	Unclassified
Barochem B464	NA 247	NA 499	2413	N/A	Unclassified
Basic violet 1	8004-87-3	39503	3584	Dye	Unclassified
BCP	NA 237	NA 465	64	N/A	Unclassified
Be-4526 phthalo blue lake r-c	NA 244	NA 488	3518	Dye	Unclassified
Benfuresate	68505-69-1	NA 187	NA 187	Herbicide	Unclassified
Bensultap	17606-31-4	NA 185	NA 185	Insecticide	Unclassified
Benzene sulfonyl chloride	98-09-9	NA 489	2415	N/A	Unclassified
Benzfendizone	158755-95-4	NA 230	NA 230	Herbicide	Unclassified
Benzobicyclon	156963-66-5	NA 230	NA 230	Herbicide	Unclassified
Benzofenap	82692-44-2	NA 211	NA 211	Herbicide	Unclassified
Benzophenone-2	131-55-5	NA 492	3063	N/A	Unclassified
Benzophenone-3	119-61-9	315	2417	N/A	Unclassified
Benzyl chloride	100-44-7	NA 486	2419	N/A	Unclassified
Berol 927	NA 894	NA 171	3874	N/A	Unclassified
Berol 968	NA 893	NA 171	3873	N/A	Unclassified
Bethoxazin	163269-30-5	NA 230	NA 230	Herbicide	Unclassified
BHA	25013-16-5	NA 484	2420	N/A	Unclassified
Bicyclic and methene resins	NA 242	NA 485	3516	N/A	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Bioban p-1487	37304-88-4	#####	1742	Microbiocide	Unclassified
Biphenyl	92-52-4	17002	227	Microbiocide, Fungicide	Unclassified
Bisphenol A	80-05-7	NA 482	3070	N/A	Unclassified
Bisphenol F	205672	NA 216	NA 215	N/A	Unclassified
Bispyribac	125401-75-4	NA 203	NA 203	Herbicide	Unclassified
Bisthiosemi	39603-48-0	NA 206	NA 206	Rodenticide	Unclassified
Block polymer of carbonyldiamide polyoxyalkylated glycol adduct	NA 850	NA 158	5011	N/A	Unclassified
Brandol	NA 1379	NA 195	NA 194	Fungicide	Unclassified
Bromoacetic acid	79-08-3	8702	NA 102	N/A	Unclassified
Burgundy mixture	NA 1380	NA 195	NA 194	Fungicide	Unclassified
Busan 1009	NA 1564	NA 227	NA 227	Fungicide	Unclassified
Butadiene-acrylonitrile copolymer	9003-18-3	NA 472	2432	N/A	Unclassified
Butane	106-97-8	NA 473	1562	N/A	Unclassified
Buthiobate	51308-54-4	NA 206	NA 206	Fungicide	Unclassified
Butyl mercaptan	109-79-5	#####	5087	Deer Repellent, Bear Repellent	Unclassified
C-PA-1224 black	NA 191	NA 379	2483	N/A	Unclassified
Calcium propionate	4075-81-4	77701	2441	Preservative	Unclassified
Cambendichlor	56141-00-5	NA 230	NA 230	Herbicide	Unclassified
Capric acid	334-48-5	#####	2315	Microbiocide	Unclassified
Capyric acid	124-07-2	#####	2316	Microbiocide	Unclassified
Caramel color	NA 720	NA 131	2444	Dye	Unclassified
Carfentrazone	128621-72-7	NA 210	NA 210	Herbicide	Unclassified
Carfentrazone-ethyl	128639-02-1	#####	5130	Herbicide	Unclassified
Carpropamid	104030-54-8	NA 203	NA 203	Fungicide	Unclassified
Cartap	15263-53-3	NA 181	NA 181	Insecticide	Unclassified
Cartap hydrochloride (unspecified hydrochloride)	22042-59-7	NA 182	NA 181	Insecticide	Unclassified
Cartap monohydrochloride	15263-52-2	NA 182	NA 181	Insecticide	Unclassified
Cetiol HE	66105-29-1	#####	NA 871	Insecticide	Unclassified
CGA-154281	NA 721	NA 132	2451	N/A	Unclassified
Chartersol-1	NA 221	NA 428	2453	Solvent	Unclassified
Chem-o-thane D-3860/D-3861	NA 223	NA 430	2454	N/A	Unclassified
Chicago sludge	68188-15-8	NA 147	3605	N/A	Unclassified
Chloracetic acid	79-11-8	#####	3102	N/A	Unclassified
Chloral-bis-acylal	NA 1344	NA 191	NA 191	Plant Growth Regulator	Unclassified
Chloral-semi-acetal	NA 1345	NA 191	NA 191	Herbicide	Unclassified
Chloretazate	NA 1403	NA 197	NA 196	Plant Growth Regulator	Unclassified
Chlorfenprop	59404-06-7	NA 181	NA 180	Herbicide	Unclassified
Chlorfenprop-methyl	14437-17-3	#####	NA 156	Herbicide	Unclassified
Chlorinated rubber	2594016	NA 427	3606	N/A	Unclassified
Chlormethiuron	28217-97-2	NA 206	NA 206	Insecticide	Unclassified
Chlorobenzene	108-90-7	56504	2460	N/A	Unclassified
Choline chloride	67-48-1	NA 191	NA 190	Rodenticide	Unclassified
Cinidon-ethyl	142891-20-1	NA 216	NA 215	Herbicide	Unclassified
Citowett	NA 218	NA 412	2471	Soap/Surfactant	Unclassified
Cloquintocet	88349-88-6	NA 219	NA 218	Herbicide Safener	Unclassified



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Cloquintocet mexyl	99607-70-2	NA 191	NA 190	Herbicide Safener	Unclassified
Cloxyfonac	32791-87-0	NA 204	NA 203	Plant Growth Regulator	Unclassified
Colgate crystal white hand dishwashing liquid	NA 202	NA 393	2476	N/A	Unclassified
Collagen	NA 203	NA 394	1805	N/A	Unclassified
Colloid 643	NA 582	NA 105	2477	N/A	Unclassified
Colloid 840	NA 791	NA 146	3527	N/A	Unclassified
Cookies	NA 641	NA 117	3621	Bait	Unclassified
Credazine	14491-59-9	NA 207	NA 206	Herbicide	Unclassified
Cubiet	NA 1367	NA 193	NA 193	Fungicide, Pruning Aid	Unclassified
Cyclohexanone	108-94-1	25902	177	Solvent	Unclassified
Cyclopentadiene polymer	NA 1450	NA 215	NA 214	Insecticide	Unclassified
Cymiazol hydrochloride	61676-87-7	NA 215	NA 214	Insecticide	Unclassified
Cymoxanil	57966-95-7	#####	4002	Fungicide	Unclassified
Cyometrinil	63278-33-1	NA 207	NA 206	Herbicide Safener	Unclassified
Cysteine	52-90-4	NA 190	NA 190	Plant Growth Regulator	Unclassified
D & C red no. 28	18472-87-2	#####	3515	Dye	Unclassified
D & C red no. 37	1632455	NA 117	3634	Dye	Unclassified
D & C yellow 10 lake	68814-04-0	NA 365	2487	Dye	Unclassified
D & C yellow no. 8	NA 829	NA 152	3991	Dye	Unclassified
D-425	NA 184	NA 367	2489	N/A	Unclassified
D-79 solvent	NA 183	NA 366	2488	Solvent	Unclassified
Daxad 23	NA 185	NA 368	2491	N/A	Unclassified
Day-glo saturn yellow AX-17- N	NA 186	NA 369	2492	Dye	Unclassified
DE-570	NA 1459	NA 216	NA 216	N/A	Unclassified
Delvet 65	NA 177	NA 357	2494	N/A	Unclassified
Desoto urethane resin	NA 179	NA 359	2497	N/A	Unclassified
Device (swimming pool algacide, bacteriacide, molluscicide) no guarantee required	NA 1503	NA 222	NA 222	Algaecide, Microbiocide, Molluscicide	Unclassified
Device, no guarantee required	NA 1502	NA 222	NA 221	N/A	Unclassified
Di-l-p-menthene	NA 1381	NA 195	NA 194	Plant Growth Regulator	Unclassified
Diafenthiuron	80060-09-9	NA 186	NA 185	Insecticide	Unclassified
Dichloro acetic acid	79-43-6	NA 105	3133	N/A	Unclassified
Dichlorovinyl acid	NA 174	NA 347	2502	Breakdown product	Unclassified
Diclobutrazol	75736-33-3	NA 186	NA 185	Fungicide	Unclassified
Diclomezine	62865-36-5	NA 204	NA 204	Fungicide	Unclassified
Dicyclanil	112636-83-6	NA 211	NA 211	Insect Growth Regulator	Unclassified
Dicyclopentadiene	77-73-6	NA 186	NA 185	Plant Growth Regulator, Dog and Cat Repellent	Unclassified
Dicyclopentadiene linseed oil copolymer	68213-53-6	31612	NA 291	N/A	Unclassified
Diethyl phosphate	598-02-7	NA 180	NA 179	Breakdown	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				product	
Diethyl sulfide	352-93-2	#####	5088	Bear Repellent	Unclassified
Diethyldithio phosphate	298-06-6	NA 180	NA 179	Breakdown product	Unclassified
Diethylthio phosphate	5871-17-0	NA 180	NA 179	Breakdown product	Unclassified
Diisoamyl ketone	2050-99-9	NA 325	3155	Solvent	Unclassified
Diisobutyl ketone	108-83-8	44107	1946	Solvent	Unclassified
Dikegulac	18467-77-1	NA 181	NA 180	Herbicide	Unclassified
Dikegulac sodium	52508-35-7	#####	2004	Plant Growth Regulator	Unclassified
Dimer acid	6144-28-1	NA 330	3158	N/A	Unclassified
Dimethyl phosphate	813-78-5	NA 180	NA 179	Breakdown product	Unclassified
Dimethyl sulfoxide	67-68-5	177	3169	Solvent	Unclassified
Dimethyldithio phosphate	756-80-9	NA 180	NA 180	Breakdown product	Unclassified
Dimethylthio phosphate	NA 1339	NA 180	NA 179	Breakdown product	Unclassified
Dioxane	123-91-1	NA 300	2529	Solvent, Impurity	Unclassified
Diphenyl methane	101-81-5	NA 301	3171	N/A	Unclassified
Diphenylamine	122-39-4	38501	228	Fungicide, Plant Growth Regulator, Insecticide	Unclassified
Dipropyl isocinchomerate	3737-22-2	NA 204	NA 204	Insect Repellent	Unclassified
Dipropyl isocinchomeronate	136-45-8	47201	681	Insect Repellent	Unclassified
Dog or cat collars	NA 155	NA 291	3645	N/A	Unclassified
Dow Corning FG-10	NA 147	NA 281	2541	N/A	Unclassified
Dowanol desg solvent	NA 725	NA 133	2538	Solvent	Unclassified
Drewplus L-768	NA 148	NA 283	2542	N/A	Unclassified
Dyestuffs	NA 689	NA 127	1913	Dye	Unclassified
Emcol AL69-49	NA 726	NA 133	2544	N/A	Unclassified
Emphos CS-121	NA 727	NA 133	2545	Soap/Surfactant	Unclassified
Emulgator	NA 143	NA 277	2546	N/A	Unclassified
Emulsogen CP 136	NA 576	NA 104	2547	Adjuvant	Unclassified
Emulsogen NP 11-300	NA 144	NA 278	2548	Adjuvant	Unclassified
Endothall	145-73-3	38901	5813	Herbicide, Defoliant	Unclassified
Endothall, di (N,N-diethylalkylamine) salt	NA 949	NA 271	1355	Herbicide, Defoliant	Unclassified
Endothall, di (N,N-dimethylalkylamine) salt	66330-88-9	38905	1904	Herbicide, Defoliant	Unclassified
Endothall, di (N,N-dimethyltridecylamine) salt	2536-26-7	38902	NA 323	Herbicide, Defoliant	Unclassified
Endothall, diammonium salt	17439-94-0	38908	NA 326	Herbicide, Defoliant	Unclassified
Endothall, dipotassium salt	2164-07-0	38904	1356	Herbicide, Defoliant	Unclassified
Endothall, disodium salt	129-67-9	38903	260	Herbicide, Defoliant	Unclassified
Endothall, mono (N,N-diethyl	NA 926	NA 4	1354	Herbicide,	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
alkylamine) salt				Defoliant	
Endothall, mono [N,N-dimethyl alkylamine] salt	NA 929	NA 61	2056	Herbicide, Defoliant	Unclassified
Endothall, mono(N,N-dimethyltridecylamine) salt	2536-27-8	38906	NA 325	Herbicide, Defoliant	Unclassified
Endothall, N,N-dimethylcocamine salt (1:2)	NA 1282	38907	NA 174	Herbicide, Algaecide	Unclassified
Epoxidized linseed oil	2232670	NA 272	2550	Insecticide, Adjuvant	Unclassified
Epoxy resins	NA 139	NA 269	3650	N/A	Unclassified
Erythrosine B	16423-68-0	#####	2224	Dye, Insecticide	Unclassified
Escorez 1102	9048-47-9	NA 146	3546	N/A	Unclassified
Espesol I	NA 140	NA 270	2552	Solvent	Unclassified
Etacelasil	37894-46-5	NA 188	NA 187	Defoliant, Plant Growth Regulator	Unclassified
Ethanethiol	75-08-1	NA 187	NA 186	Rodenticide	Unclassified
Ethomeen	NA 136	NA 265	2553	N/A	Unclassified
Ethyl acrylate	140-88-5	NA 259	2117	N/A	Unclassified
Ethyl formate	109-94-4	43102	278	Fumigant, Insecticide	Unclassified
Ethyl methacrylate	97-63-2	NA 248	3203	N/A	Unclassified
Ethylene-acrylic acid copolymer	9010-77-9	NA 253	3653	Adjuvant	Unclassified
Ethylene-acrylic terpolymer	NA 133	NA 254	1950	Adjuvant	Unclassified
Ethylhexanoate	123-66-0	NA 190	NA 190	Fungicide, Microbiocide	Unclassified
Extender	NA 1377	NA 195	NA 194	Synergist	Unclassified
Fatty alcohols	NA 1364	NA 193	NA 192	Plant Growth Regulator, Adjuvant	Unclassified
FD&C blue no. 1 aluminum lake	53026-57-6	NA 242	3000	Dye	Unclassified
FD&C green no. 3	NA 127	NA 243	2566	Dye	Unclassified
FD&C red no. 40	NA 947	#####	2567	Dye, Impurity	Unclassified
Feed supplements	NA 128	NA 244	3655	N/A	Unclassified
Fenchlorazole	103112-35-2	NA 181	NA 181	Herbicide Safener	Unclassified
Fenchlorim	3740-92-9	NA 182	NA 181	Herbicide Safener	Unclassified
Fenitropan	65934-95-4	NA 207	NA 207	Fungicide	Unclassified
Fenpiclonil	74738-17-3	NA 188	NA 187	Fungicide	Unclassified
Fenpropidin	67306-00-7	NA 184	NA 183	Fungicide	Unclassified
Fenpropimorph	67306-03-0	#####	NA 988	Fungicide	Unclassified
Fenpropimorph	67564-91-4	NA 201	NA 200	Fungicide	Unclassified
Fenthiosulf	NA 1406	NA 198	NA 197	Insecticide	Unclassified
Fertilizer, general	NA 729	NA 133	2569	N/A	Unclassified
Filter paper e-d-601-25	NA 122	NA 235	3525	N/A	Unclassified
Flomo 1212	NA 124	NA 239	2572	Soap/Surfactant	Unclassified
Flomo 4NP	NA 616	NA 112	2573	Soap/Surfactant	Unclassified
Florasulam	NA 1447	NA 214	NA 214	Herbicide	Unclassified
Flubenzimine (unstated stereochemistry)	37893-02-0	NA 188	NA 187	Insecticide	Unclassified
Flumequine	42835-25-6	NA 188	NA 187	Microbiocide	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Flumiclorac	87547-04-4	NA 232	NA 232	Herbicide	Unclassified
Flumipropyn	84478-52-4	NA 229	NA 229	Herbicide	Unclassified
Flupropanate	756-09-2	NA 204	NA 204	Herbicide	Unclassified
Flupropanate, sodium salt	22898-01-7	NA 211	NA 211	Herbicide	Unclassified
Flurazole	72850-64-7	NA 187	NA 186	Herbicide Safener	Unclassified
Flurtamone	96525-23-4	NA 217	NA 216	Herbicide	Unclassified
Fluthiacet	149253-65-6	NA 205	NA 204	Herbicide	Unclassified
Fluxofenim	88485-37-4	NA 202	NA 201	Herbicide Safener	Unclassified
Formaldehyde	50-00-0	43001	295	Microbiocide, Fungicide	Unclassified
Fosetyl-Al	39148-24-8	#####	2210	Fungicide	Unclassified
Fragrance 1256 H	NA 115	NA 227	2575	Fragrance	Unclassified
Fragrance for mosquito repellent p-7510	51843	NA 140	3007	Fragrance	Unclassified
Fragrance N-5716	NA 116	NA 228	3852	Fragrance	Unclassified
Fragrance orange 418228	NA 117	NA 229	3889	Fragrance	Unclassified
Fragrance PNLF 6986	NA 633	NA 116	3563	Fragrance	Unclassified
Fragrance RS-2661	NA 824	NA 151	3891	Fragrance	Unclassified
Frambinone	5471-51-2	NA 212	NA 212	Fragrance	Unclassified
Fumaric acid	110-17-8	51201	297	N/A	Unclassified
Fumaric and crotonic acids, esters of	NA 118	NA 230	1711	N/A	Unclassified
Fumigants	NA 1492	NA 221	NA 221	Fumigant	Unclassified
Furaneol 15% p.g.	NA 119	NA 231	2576	N/A	Unclassified
Furfural	98-01-1	43301	1522	N/A	Unclassified
Gentian	97676-22-7	#####	NA 108	Dye	Unclassified
Gentian violet	548-62-9	39502	1270	Microbiocide, Dye	Unclassified
Gentian violet	548-62-9	98401	NA 173	Microbiocide, Dye	Unclassified
Givaudan muquet PA-6664	NA 575	NA 104	2580	N/A	Unclassified
Glidden no. 3200 white latex	NA 113	NA 224	2581	N/A	Unclassified
Glue	NA 643	NA 118	3661	N/A	Unclassified
Glufosinate	51276-47-2	NA 203	NA 202	Herbicide	Unclassified
Glufosinate-ammonium	77182-82-2	#####	3946	Herbicide	Unclassified
Grease (bands, fruit trees)	NA 1350	NA 192	NA 191	Insecticide	Unclassified
Green M liquid dye	NA 106	NA 211	3840	Dye	Unclassified
Heptopargil	73886-28-9	NA 208	NA 207	Plant Growth Regulator	Unclassified
Heptyl butyrate	5870-93-9	NA 207	3668	N/A	Unclassified
Hi-sol 15	NA 97	NA 192	2594	Solvent	Unclassified
Hostaphat MDAR-N-040	NA 98	NA 193	2596	N/A	Unclassified
Hostapon T powder highly concentrated	97-80-3	NA 171	3942	N/A	Unclassified
Hydrazine	302-01-2	NA 195	2598	Impurity, Breakdown product	Unclassified
Hydrolysed linseed fatty acid	NA 1436	NA 212	NA 212	N/A	Unclassified
Hydroxyl amine sulfate	10039-54-0	NA 181	3235	N/A	Unclassified
Hydroxyphenyl-salicylamide	NA 1396	NA 197	NA 196	Fungicide	Unclassified
Inabenfide	82211-24-3	NA 205	NA 204	Plant Growth Regulator	Unclassified

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Indanofan	133220-30-1	NA 232	NA 232	Herbicide	Unclassified
Indigo carmine	860-22-0	NA 146	3530	Dye	Unclassified
Inert (VOC reevaluation)	NA 877	NA 169	3973	N/A	Unclassified
Inert ingredients	NA 872	NA 160	0	N/A	Unclassified
Instex 10100 color concentrate (black)	NA 88	NA 170	2615	Dye	Unclassified
Irganox 1010	6683-19-8	NA 173	3623	N/A	Unclassified
Irganox 1010	6683-19-8	NA 170	3523	N/A	Unclassified
Irganox 1076	2082-79-3	NA 174	2617	N/A	Unclassified
Iso-amyl mercaptan	541-31-1	NA 213	NA 212	N/A	Unclassified
Isobutyl acetate	110-19-0	NA 143	3241	N/A	Unclassified
Isobutyric acid	79-31-2	#####	2110	Preservative	Unclassified
Isooctyl phosphate	12645-53-3	NA 162	3258	Soap/Surfactant, Adjuvant	Unclassified
Isopropanolamine nitrite	NA 87	NA 166	3245	N/A	Unclassified
Isopropylamine	75-31-0	NA 157	3246	N/A	Unclassified
Isoprophthiolane	50512-35-1	NA 189	NA 188	Fungicide	Unclassified
Isoval	NA 1385	NA 195	NA 195	Rodenticide	Unclassified
Isoxapyrifop	87757-18-4	NA 208	NA 208	Herbicide	Unclassified
Ivory snow	NA 75	NA 146	3674	N/A	Unclassified
K 1A112	NA 77	NA 148	2628	N/A	Unclassified
Kelsol 5134	68309-52-4	NA 149	3526	Solvent	Unclassified
Ketoconazole	65277-42-1	NA 216	NA 215	Fungicide	Unclassified
Korax	2425-66-3	11302	351	N/A	Unclassified
Krynac 1122	NA 79	NA 151	2632	N/A	Unclassified
Latex paint	NA 74	NA 144	2634	N/A	Unclassified
Leonil DB powder	NA 71	NA 139	2639	N/A	Unclassified
Lignoflex	NA 68	NA 131	3265	N/A	Unclassified
Limonia 19-11189	NA 69	NA 132	2643	N/A	Unclassified
Linseed-soya alkyd resin	NA 62	NA 117	2646	N/A	Unclassified
Lithium (perfluorooctane)sulfonate	29457-72-5	75004	5678	Insecticide, Adjuvant	Unclassified
Long oil alkyd 5070	NA 64	NA 120	2648	Insecticide	Unclassified
Lubrizol 544	NA 65	NA 121	2649	Solvent, Adjuvant	Unclassified
Luna yellow NB-1 1270	NA 66	NA 122	2651	Dye	Unclassified
Luviset cap	25035-26-1	NA 123	3867	N/A	Unclassified
Macroplast UK 8202/UK 5400	NA 57	NA 108	2652	N/A	Unclassified
Macroplast VAX-11688/UK 5400	NA 58	NA 109	2653	N/A	Unclassified
Malachite green	569-64-2	39504	366	Dye	Unclassified
Maleic anhydride	108-31-6	NA 102	3272	N/A	Unclassified
Maleic anhydride, polymer with 2,4,4-trimethyl pentane, sodium salt	37199-81-8	NA 103	3271	N/A	Unclassified
Maleic hydrazide	123-33-1	51501	368	Plant Growth Regulator	Unclassified
Maleic hydrazide	10071-13-3	NA 210	NA 209	Plant Growth Regulator	Unclassified
Maleic hydrazide, choline salt	71203-19-5	51504	NA 422	Plant Growth Regulator	Unclassified
Maleic hydrazide, diethanolamine salt	5716-15-4	51502	778	Plant Growth Regulator	Unclassified
Maleic hydrazide, potassium	28382-15-2	51503	2130	Plant Growth	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
salt				Regulator, Herbicide	
Malic acid	6915-15-7	51101	1364	Microbiocide	Unclassified
Mark 1500	NA 49	NA 96	2663	N/A	Unclassified
Mark 1600	NA 50	NA 97	2664	N/A	Unclassified
Mark 1601	NA 51	NA 98	2665	N/A	Unclassified
Mark 1603	NA 740	NA 135	2666	N/A	Unclassified
Mark 1607	NA 569	NA 103	2667	N/A	Unclassified
Mark 495	NA 56	NA 107	2660	N/A	Unclassified
Mark 565A	NA 48	NA 95	2661	N/A	Unclassified
Mark 706	NA 739	NA 135	2662	N/A	Unclassified
Marter white 400	NA 52	NA 99	2668	N/A	Unclassified
Medicated block	NA 47	NA 92	3684	N/A	Unclassified
Mefenpyr	135591-00-3	NA 182	NA 181	Herbicide Safener	Unclassified
Mefenpyr-diethyl	135590-91-9	R47618	NA 177	Herbicide Safener	Unclassified
Menhaden oil	8002-50-4	NA 93	3686	N/A	Unclassified
Menthol	1490-04-6	51601	1074	Dog and Cat Repellent	Unclassified
Methoxy-2,4-dihydroxy pentene	NA 46	NA 89	3281	N/A	Unclassified
Methoxyphenone	41295-28-7	NA 209	NA 208	Herbicide	Unclassified
Methyl esters of cottonseed oil	61788-60-1	NA 148	3687	Adjuvant	Unclassified
Methyl ethyl ketone	78-93-3	44103	2680	Solvent	Unclassified
Methyl formate	107-31-3	53701	391	Fumigant	Unclassified
Methyl hydrogenated rosinat	8050-15-5	NA 82	3688	N/A	Unclassified
Methyl isocyanate	624-83-9	NA 180	NA 180	Breakdown product	Unclassified
Methyl isothiocyanate	556-61-6	68103	392	Fumigant, Insecticide, Herbicide, Nematicide, Breakdown product	Unclassified
Methyl methacrylate	80-62-6	NA 78	2151	N/A	Unclassified
Methylene blue	61-73-4	39505	387	Fungicide, Dye	Unclassified
Metosulam	139528-85-1	NA 184	NA 184	Herbicide	Unclassified
Milorganite	68512-89-0	NA 66	3693	N/A	Unclassified
MKH 6561	NA 1466	NA 217	NA 216	Herbicide	Unclassified
MON 4660	71526-07-3	#####	NA 162	N/A	Unclassified
Monosodium glutamate	32221-81-1	NA 59	2691	N/A	Unclassified
Morwet EFW	NA 36	NA 60	2693	Adjuvant	Unclassified
Morwet IP	NA 568	NA 102	3694	Adjuvant	Unclassified
Morwet IP	NA 887	NA 170	2694	Adjuvant	Unclassified
Multiresidue carbamate screen	NA 848	NA 158	4042	N/A	Unclassified
Multiresidue chlorinated hydrocarbon screen	NA 847	NA 158	4043	N/A	Unclassified
Multiresidue organophosphate screen	NA 846	NA 158	4044	N/A	Unclassified
Multiresidue triazine screen	NA 845	NA 157	4045	N/A	Unclassified
N,N-Diallyl-2,2- dichloroacetamide	37764-25-3	NA 187	NA 186	Herbicide Safener	Unclassified
n-Butyl acetate	142-62-1	#####	2434	N/A	Unclassified

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
N-methyl-2-pyrrolidone	237900	NA 76	2684	N/A	Unclassified
N-TDF	NA 22	NA 34	2713	N/A	Unclassified
Naphthalene-formaldehyde condensate sulfonic acid, metallic salts	9008-63-3	NA 58	2692	Insecticide, Fungicide, Microbiocide, Adjuvant	Unclassified
Naphthalic anhydride	81-84-5	NA 209	NA 208	Herbicide Safener	Unclassified
Neo-decanoic acid	26896-20-8	97501	2699	N/A	Unclassified
Neodol 25	63393-82-8	NA 51	3930	N/A	Unclassified
Neuessence powder 411669	NA 781	NA 140	3003	N/A	Unclassified
Nipyraclofen	99662-11-0	NA 229	NA 229	Herbicide	Unclassified
Nitrile rubber	NA 743	NA 135	2704	N/A	Unclassified
Nitro ethane	79-24-3	NA 49	3298	Solvent	Unclassified
Nitromethane	75-52-5	NA 42	3299	Solvent	Unclassified
Nitrothal-isopropyl	10552-74-6	NA 181	NA 180	Fungicide	Unclassified
Non-ionic surfactants	NA 1443	NA 214	NA 213	Soap/Surfactant, Adjuvant	Unclassified
Nonoxynol-9-phosphate	NA 29	NA 43	2706	Adjuvant	Unclassified
Norbormide	991-42-4	86201	2711	N/A	Unclassified
Nuostabe v-1913	NA 23	NA 35	2715	N/A	Unclassified
Nuxtra calcium 6% catalyst	NA 25	NA 37	2716	N/A	Unclassified
Nuxtra calcium 8% catalyst	NA 26	NA 38	2717	N/A	Unclassified
Nuxtra manganese 9% catalyst	NA 15	NA 24	2718	N/A	Unclassified
Nylon	32131-17-2	NA 25	3703	N/A	Unclassified
Octachlorostyrene	29082-74-4	NA 215	NA 215	N/A	Unclassified
Orvus ES paste concentrate	NA 3	NA 3	2726	N/A	Unclassified
Ovex	80-33-1	20201	452	Insect Growth Regulator	Unclassified
Oxabetrinil	74782-23-3	NA 205	NA 204	Herbicide Safener	Unclassified
Oxadiargyl	39807-15-3	NA 211	NA 211	Herbicide	Unclassified
Oxapyrazon	4489-31-0	NA 209	NA 208	Herbicide	Unclassified
Oxapyrazon sodium	25316-56-7	NA 217	NA 217	Herbicide	Unclassified
Oxaziclomefone	153197-14-9	NA 233	NA 233	Herbicide	Unclassified
Oxidized polyethylene	68441-17-8	NA 118	3713	N/A	Unclassified
Oxygenated solvents	NA 379	NA 687	1767	Solvent	Unclassified
p-Chloronitrobenzene	100-00-5	NA 183	NA 182	Insecticide	Unclassified
Paint	NA 380	NA 688	3715	N/A	Unclassified
Panasol AN -2	NA 381	NA 690	2733	Solvent	Unclassified
Panasol AN-3	NA 382	NA 691	2732	Solvent	Unclassified
Paraformaldehyde	30525-89-4	43002	456	Microbiocide, Fungicide, Insecticide	Unclassified
Pareth 91-8	NA 889	NA 170	2734	N/A	Unclassified
Pentoxazone	110956-75-7	NA 233	NA 233	Herbicide	Unclassified
Perfluorooctane sulfonate	NA 1456	NA 216	NA 215	Insecticide	Unclassified
Perfume 08-28	NA 750	NA 136	2740	Fragrance	Unclassified
Perfume bouquet no. 3	NA 366	NA 672	2741	Fragrance	Unclassified
Perfume, chem-mask C no. 280	NA 367	NA 673	2742	Fragrance	Unclassified
Perfume, colonial bouquet 8095	NA 368	NA 674	2744	Fragrance	Unclassified
Perfume, compound 2-2723	NA 752	NA 136	2745	Fragrance	Unclassified
Perfume, compound 44.368/g	NA 370	NA 676	2747	Fragrance	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Perfume, compound bouquet EC	NA 369	NA 675	2746	Fragrance	Unclassified
Perfume, DL 10613	NA 823	NA 151	3888	Fragrance	Unclassified
Perfume, eaudesol mal (special)	NA 371	NA 677	2748	Fragrance	Unclassified
Perfume, fragrance oil 6198 AG	NA 372	NA 678	2750	Fragrance	Unclassified
Perfume, fresh meadows #651	NA 753	NA 136	2751	Fragrance	Unclassified
Perfume, herbal fragrance oil no. 062	NA 354	NA 657	2753	Fragrance	Unclassified
Perfume, malamasque no. 59	NA 355	NA 658	2754	Fragrance	Unclassified
Perfume, malathion 21-639	NA 356	NA 659	2755	Fragrance	Unclassified
Perfume, marbelle 72160A	NA 357	NA 660	2756	Fragrance	Unclassified
Perfume, mimosa no. 5	NA 754	NA 136	2757	Fragrance	Unclassified
Perfume, neutroleum alpha	NA 358	NA 661	2758	Fragrance	Unclassified
Perfume, new mown hay	NA 359	NA 662	2759	Fragrance	Unclassified
Perfume, norda EC-137	NA 360	NA 663	2760	Fragrance	Unclassified
Perfume, pet perfume # 27253	NA 361	NA 664	2761	Fragrance	Unclassified
Perfume, phase b-5	NA 755	NA 136	2762	Fragrance	Unclassified
Perfume, R-7402	NA 362	NA 665	2763	Fragrance	Unclassified
Perfume, veilex 40019	NA 363	NA 666	2764	Fragrance	Unclassified
Perfume, washroom cleaner bouquet # 152-587	NA 364	NA 667	2765	Fragrance	Unclassified
Phenyl ether	101-84-8	NA 653	3324	N/A	Unclassified
Phosametine	NA 1400	NA 197	NA 196	Herbicide	Unclassified
Phosdiphen	36519-00-3	NA 209	NA 209	Fungicide	Unclassified
Phosphoproteins	NA 350	NA 646	1250	N/A	Unclassified
Phthalaldehyde	643-79-8	#####	5107	Microbiocide	Unclassified
Phthalide	27355-22-2	NA 205	NA 205	Fungicide	Unclassified
Phthalo green	NA 348	NA 642	2779	Dye	Unclassified
Picardin	NA 1434	NA 212	NA 211	Insect Repellent	Unclassified
Pigment blue 29	57455-37-5	NA 643	2780	Dye	Unclassified
Pigment green 7	1328-53-6	NA 636	3870	Dye	Unclassified
Pigment red 178	3049-71-6	NA 637	3869	Dye	Unclassified
Pigment red 57:1	6887-51-9	NA 171	3868	Dye	Unclassified
Pigment red no. 48	16013-44-8	NA 149	3729	Dye	Unclassified
Pimaricin	7681-93-8	NA 203	NA 202	Fungicide	Unclassified
Piperalin	3478-94-2	97003	488	Fungicide	Unclassified
Piperine	94-62-2	NA 223	NA 223	N/A	Unclassified
Piproctanyl	69309-47-3	NA 209	NA 209	Plant Growth Regulator	Unclassified
Piproctanyl bromide	56717-11-4	NA 218	NA 217	Plant Growth Regulator	Unclassified
Plastic polymers	NA 339	NA 625	764	Adjuvant	Unclassified
Plurafac B-26	69227-21-0	NA 626	2782	N/A	Unclassified
Plurafac C-17	69227-21-0	NA 137	2783	N/A	Unclassified
Pluraflo E4A	NA 340	NA 627	2784	Soap/Surfactant	Unclassified
Pluronic 10-R-5	NA 345	NA 632	2790	N/A	Unclassified
Pluronic I-101	NA 759	NA 137	2788	N/A	Unclassified
Pluronic L-62 LF	NA 342	NA 629	2786	N/A	Unclassified
Pluronic L61	NA 341	NA 628	2785	N/A	Unclassified
Pluronic I63	NA 343	NA 630	2787	N/A	Unclassified
Pluronic P-104	NA 344	NA 631	2789	N/A	Unclassified



<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
PMS-5406-T pigment	NA 346	NA 633	2791	N/A	Unclassified
Po-san	37339-61-0	98804	NA 861	N/A	Unclassified
Po-san	76930-44-4	98804	NA 862	N/A	Unclassified
Poly(oxyethylene) (dimethylimino) ethylene (dimethylimino) ethylene dichloride	31512-74-0	69183	1576	Microbiocide	Unclassified
Poly-i-para-menthene	34363-01-4	NA 610	1314	Insect Growth Regulator	Unclassified
Polyacrylamide polymer	2592984	NA 634	2111	Adjuvant	Unclassified
Polyalkylene ether	NA 347	NA 635	2271	Adjuvant	Unclassified
Polyamide resin	NA 621	NA 112	2795	N/A	Unclassified
Polyamine polymer	NA 334	NA 620	1907	Adjuvant	Unclassified
Polyhexamethylene biguanidine	32289-58-0	#####	2258	Microbiocide, Fungicide	Unclassified
Polymer emulsion K	NA 329	NA 611	2804	Adjuvant	Unclassified
Polymerized acrylic acid	2592860	52902	3738	Adjuvant	Unclassified
Polyoxin	11113-80-7	NA 194	NA 193	Fungicide	Unclassified
Polyurethane	NA 426	NA 768	3770	N/A	Unclassified
Polyvinyl butyral resin	NA 427	NA 769	2820	N/A	Unclassified
Polyvinyl chloride	9002-86-2	NA 770	2821	N/A	Unclassified
Polyvinylpyrrolidone-formaldehyde complex	82010-83-1	43003	NA 367	Microbiocide	Unclassified
Polyvis O-SH	NA 428	NA 771	2823	N/A	Unclassified
Poly[hydroxyethylene(dimethyliminio)ethylene(dimethyliminio)methylene dichloride]	NA 1512	NA 223	NA 222	Microbiocide	Unclassified
Potassium 3-(2-(2-((2-(2-hydroxy ethyl) ethyl) octadecyl amino)ethoxy) propionate	NA 998	NA 779	3352	Preservative	Unclassified
Potassium N-ethyl perfluoro octane sulfonamide acetate	NA 997	NA 777	3354	Insecticide, Adjuvant	Unclassified
Probenazole	27605-76-1	NA 205	NA 205	Fungicide, Microbiocide	Unclassified
Propellant A-46	NA 441	NA 794	2834	Propellant	Unclassified
Propellant A-70	NA 762	NA 137	2835	Propellant	Unclassified
Propellant A-91	NA 442	NA 795	2836	Propellant	Unclassified
Propellant B-46	NA 443	NA 796	3887	Propellant	Unclassified
Propidine	NA 1449	NA 215	NA 214	Insect Repellent	Unclassified
Propionic acid	79-09-4	77702	505	Fungicide, Microbiocide, Preservative	Unclassified
Propyl-3-t-butylphenoxyacetate	NA 1407	NA 198	NA 197	Plant Growth Regulator	Unclassified
Pyrazolynate	58011-68-0	NA 205	NA 205	Herbicide	Unclassified
Pyribenzoxim	168088-61-7	NA 233	NA 233	Herbicide	Unclassified
Pyriminobac	136191-56-5	NA 206	NA 205	Herbicide	Unclassified
Pyroquilon	57369-32-1	NA 190	NA 189	Fungicide	Unclassified
Quinacetol sulfate	57130-91-3	NA 210	NA 209	Fungicide	Unclassified
Quinizarin green SS	128-80-3	NA 109	3374	Dye	Unclassified
Quinoclamine	2797-51-5	NA 185	NA 184	Herbicide, Algaecide	Unclassified
Quinoxifen	124495-18-7	NA 206	NA 205	Fungicide	Unclassified
Resins and polymers	NA 1374	NA 194	NA 193	Pruning Aid,	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
				Adjuvant	
RH - 2485	NA 1467	NA 217	NA 217	Insecticide	Unclassified
Rhodamine B	81-88-9	NA 138	2846	Dye	Unclassified
Sebacic acid	111-20-6	NA 187	NA 186	Repellent	Unclassified
Sec-butylamine	13952-84-6	4214	1704	Fungicide	Unclassified
Seconal	76-73-3	NA 190	NA 189	N/A	Unclassified
Secret formula no. 1	NA 2	NA 2	1837	N/A	Unclassified, Unclassified
Secret formula no. 2	NA 458	NA 820	1838	N/A	Unclassified
Silthiofam	175217-20-6	NA 210	NA 210	Fungicide	Unclassified
Sintofen	130561-48-7	NA 185	NA 184	Plant Growth Regulator	Unclassified
Sodium 2-ethylhexanoate	19766-89-3	NA 214	NA 214	Fungicide, Microbiocide	Unclassified
Sodium caprylate	29372	79063	3388	N/A	Unclassified
Sodium chloroacetate	3926-62-3	#####	NA 141	Herbicide	Unclassified
Sodium diacetoneketogulonate	NA 1397	NA 197	NA 196	Plant Growth Regulator	Unclassified
Sodium gluconate	527-07-1	105	3406	N/A	Unclassified
Sodium methyl sulfate	512-42-5	NA 145	3417	N/A	Unclassified
Sodium petroleum sulfonate	68608-26-4	79035	3431	Insecticide, Adjuvant	Unclassified
Sodium propionate	137-40-6	77703	3434	Fungicide, Preservative	Unclassified
Solulan 98	NA 474	NA 874	2867	Solvent	Unclassified
Solulan L-575	NA 763	NA 138	2868	N/A	Unclassified
Solvent red 49	509-34-2	NA 875	3900	Dye	Unclassified
Spiroxamine	118134-30-8	NA 202	NA 202	Fungicide	Unclassified
Sponto 168	NA 484	NA 888	2875	N/A	Unclassified
Sponto 232T	NA 492	NA 896	2885	N/A	Unclassified
Sponto 234T	NA 766	NA 138	2886	N/A	Unclassified
Sponto AK-30-02BT	NA 485	NA 889	2876	N/A	Unclassified
Sponto AK31-27A	NA 764	NA 138	2877	N/A	Unclassified
Sponto AK31-27B	NA 486	NA 890	2878	N/A	Unclassified
Sponto AK31-38	NA 487	NA 891	2879	N/A	Unclassified
Sponto AK31-56A	NA 488	NA 892	2880	N/A	Unclassified
Sponto AK31-56B	NA 765	NA 138	2881	N/A	Unclassified
Sponto AK31-56M	NA 632	NA 116	3558	N/A	Unclassified
Sponto N-140B	NA 489	NA 893	2882	N/A	Unclassified
Sponto N-300B	NA 490	NA 894	2883	N/A	Unclassified
Sponto N-500B	NA 491	NA 895	2884	N/A	Unclassified
Sta-pro 3000	NA 493	NA 897	2889	N/A	Unclassified
Stepan C-65 methyl ester	NA 496	NA 903	2893	N/A	Unclassified
Stepantan A	NA 497	NA 904	2894	N/A	Unclassified
Stepfac 8172	NA 767	NA 138	2895	N/A	Unclassified
Sterilix	NA 656	NA 121	550	Microbiocide	Unclassified
Sterox NJ	NA 498	NA 905	2896	N/A	Unclassified
Stoddard solvent	8052-41-3	63504	NA 516	Solvent, Herbicide, Insecticide	Unclassified
Styrene acrylic copolymer	25085-34-1	NA 907	3457	Adjuvant	Unclassified
Styrene/pvp copolymer	25086-29-7	NA 908	3812	Adjuvant	Unclassified
Sudan III	85-86-9	NA 909	3459	Dye	Unclassified
Sulcotrione	99105-77-8	NA 185	NA 184	Herbicide	Unclassified

Chemical Name	CAS Number	U.S. EPA PC Code	CA Chem Code	Use Type	Chemical Class
Sulfated dipentane	NA 500	NA 911	3460	N/A	Unclassified
Sulfonated cod liver oil	NA 1464	NA 217	NA 216	N/A	Unclassified
Sulglycapin	51068-60-1	NA 233	NA 233	Herbicide	Unclassified
Sure sol 180	NA 505	NA 916	2903	Solvent	Unclassified
Surflo B11	NA 606	NA 110	2904	Soap/Surfactant	Unclassified
Surflo B13	NA 506	NA 917	2905	Soap/Surfactant	Unclassified
Surflo B16	NA 507	NA 918	2906	Soap/Surfactant	Unclassified
Surflo B17	NA 508	NA 919	2907	Soap/Surfactant	Unclassified
Surflo B19	NA 770	NA 139	2908	Soap/Surfactant	Unclassified
Sustane 3	NA 622	NA 113	2909	N/A	Unclassified
T-DET N-9.5	NA 513	NA 928	2917	N/A	Unclassified
T-mulz 565	NA 528	NA 955	2944	Adjuvant	Unclassified
T-mulz 94W	NA 531	NA 958	2949	Adjuvant	Unclassified
T-mulz AO2	NA 772	NA 139	2943	N/A	Unclassified
T-mulz O	NA 529	NA 956	2945	Adjuvant	Unclassified
T-mulz PB	NA 530	NA 957	2946	Adjuvant	Unclassified
T-Mulz VO	NA 610	NA 111	2947	N/A	Unclassified
T-mulz W	NA 773	NA 139	2948	N/A	Unclassified
Tabu powder	NA 510	NA 922	1462	N/A	Unclassified
Tacks	NA 818	NA 151	3816	N/A	Unclassified
Tenneco 225F PVC resin	NA 514	NA 930	2919	N/A	Unclassified
Tenneco T500-100	NA 771	NA 139	2920	N/A	Unclassified
Tenox 2	NA 515	NA 931	2921	Preservative	Unclassified
Tenox 4	NA 516	NA 932	2922	Preservative	Unclassified
Tenox R	NA 517	NA 933	2923	Preservative	Unclassified
Tenox S-1	NA 518	NA 934	2924	Preservative	Unclassified
Tensiofix B7416	NA 895	NA 171	3943	Soap/Surfactant	Unclassified
Tensiofix B7453	NA 896	NA 171	3944	Soap/Surfactant	Unclassified
Tergitol 15-S-12	NA 623	NA 113	2926	N/A	Unclassified
Tergitol 15-S-12 acrylate	NA 519	NA 935	2927	N/A	Unclassified
Tergitol 15-S-20	NA 520	NA 936	2928	N/A	Unclassified
tert-Butylamine Endothall	26648-01-1	38909	NA 327	Herbicide, Defoliant	Unclassified
Tetrahydrofuran	109-99-9	NA 944	2933	Solvent	Unclassified
Texaphor special	NA 524	NA 951	2935	N/A	Unclassified
TF-310	NA 525	NA 952	3524	N/A	Unclassified
Thanite	115-31-1	47101	586	Insecticide	Unclassified
Thickener, unknown	NA 526	NA 953	2936	Adjuvant	Unclassified
Thicyofen	116170-30-0	NA 210	NA 209	Fungicide	Unclassified
Thidiazimin	123249-43-4	NA 230	NA 229	Herbicide	Unclassified
Thiocyclam	31895-21-3	NA 182	NA 181	Insecticide	Unclassified
Thiocyclam hydrogen oxalate	31895-22-4	#####	NA 104	Insecticide	Unclassified
Thixatrol ST	NA 820	NA 151	3853	N/A	Unclassified
Toximul 500	NA 532	NA 963	2951	Insecticide	Unclassified
Toximul 850 m	NA 826	NA 152	3918	N/A	Unclassified
Toximul D	NA 533	NA 964	2952	N/A	Unclassified
Toximul H	NA 534	NA 965	2953	N/A	Unclassified
Toximul P	NA 774	NA 140	2954	N/A	Unclassified
Toximul TA-5	NA 535	NA 966	2955	N/A	Unclassified
Triapenthenol	76608-88-3	NA 190	NA 189	Plant Growth Regulator	Unclassified
Triaryl methane	NA 536	NA 967	2957	N/A	Unclassified
Triazoxide	72459-58-6	NA 185	NA 184	Fungicide	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Tributyl phosphate	126-73-8	NA 969	3480	N/A	Unclassified
Trichlamide	70193-21-4	NA 210	NA 209	Fungicide	Unclassified
Trichloropyridinol	NA 1338	NA 180	NA 179	Breakdown product	Unclassified
Tridemorph	24602-86-6	#####	NA 987	Fungicide	Unclassified
Tridemorph	81412-43-3	#####	NA 201	Fungicide	Unclassified
Triethyl phosphate	78-40-0	NA 979	3489	N/A	Unclassified
Trioxymethylene	110-88-3	NA 190	NA 189	Microbiocide, Fungicide	Unclassified
Triton CF-10	NA 542	NA 991	2968	Soap/Surfactant	Unclassified
Triton X-363	NA 612	NA 111	2969	Soap/Surfactant	Unclassified
Trycol NP-4	NA 775	NA 140	2970	N/A	Unclassified
Trycol NP-6	NA 543	NA 993	2971	N/A	Unclassified
Trycol NP-9	NA 544	NA 994	2972	N/A	Unclassified
Tryfac 5566	NA 545	NA 995	2973	N/A	Unclassified
Tryfac 910-K	NA 546	NA 996	2974	N/A	Unclassified
Turgasept	NA 776	NA 140	2975	N/A	Unclassified
Ucar solution vinyl VAGH	NA 548	NA 999	2976	N/A	Unclassified
UL-94 HF1 listed polyester foam	NA 549	NA 100	2977	N/A	Unclassified
Unknown (In EPA Product data w/o name)	NA 1175	67323	NA 165	Fungicide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1176	69144	NA 165	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1177	69162	NA 165	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1178	79061	NA 165	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1179	#####	NA 166	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1180	#####	NA 166	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1181	#####	NA 166	Microbiocide	Unclassified
Unknown (In EPA Product data w/o name)	NA 1182	#####	NA 166	N/A	Unclassified
Unknown (In EPA Product data w/o name)	NA 1183	#####	NA 166	N/A	Unclassified
Urethane adhesive, parts a & b	NA 551	NA 100	2979	N/A	Unclassified
Versalon 1112	NA 613	NA 111	2984	N/A	Unclassified
Versamid resins	NA 651	NA 119	3822	N/A	Unclassified
Vinyl acetate	108-05-4	NA 100	2116	N/A	Unclassified
Vinyl polymer	NA 680	NA 125	1754	Adjuvant	Unclassified
Vinyl resin, synthetic	NA 554	NA 100	1533	N/A	Unclassified
Vitamin K3	58-27-5	6319	NA 89	N/A	Unclassified
Water soluble dyes	NA 1517	NA 223	NA 223	Dye	Unclassified
Waxes	NA 1376	NA 194	NA 194	Pruning Aid, Adjuvant	Unclassified
Wickenol 535	NA 779	NA 140	2989	N/A	Unclassified
Wing stay V	NA 561	NA 101	2990	N/A	Unclassified
Witafrol 7420	NA 625	NA 113	2991	N/A	Unclassified
Witcamine tam-45	NA 562	NA 101	2992	N/A	Unclassified
Witco C-5752	NA 563	NA 101	3882	N/A	Unclassified
Witconate p-1020bu	NA 614	NA 111	3884	N/A	Unclassified

<u>Chemical Name</u>	<u>CAS Number</u>	<u>U.S. EPA PC Code</u>	<u>CA Chem Code</u>	<u>Use Type</u>	<u>Chemical Class</u>
Witconol 1S-108	NA 564	NA 101	2993	N/A	Unclassified
Zein	9010-66-6	NA 102	3504	N/A	Unclassified

\* N/A = Not Available\

## II. Augmenting the Sensitivity of Plants to Herbicides

In certain embodiments of the invention, the effectiveness of herbicides is augmented by methods and compositions for the contemporaneous administration of one or more ectophosphatase inhibitors in combination with herbicides. Such applications may, in addition to increasing the effectiveness of herbicides, allow the use of reduced concentrations of herbicides, thereby providing cost and environmental benefits.

Specifically contemplated by the invention are compositions comprising one or more ectophosphatase inhibitor(s) in combination with one or more herbicide(s) listed in Table 1. In one embodiment of the invention, the ectophosphatase inhibitor may or may not be a compound selected from formula I-XX. The herbicidal compositions or other compositions formulated for agricultural use, including compositions comprising insecticides and growth regulators, may be used with potentially any plant. The term "plant," as used herein, refers to any type of plant. The inventors have provided below an exemplary description of some plants that may be used with the invention. However, the list is provided for illustrative purposes only and is not limiting, as other types of plants will be known to those of skill in the art and could be used with the invention.

Non-limiting examples of plant genera that may be treated in accordance with the invention include: *Abutilon*, *Amaranthus*, *Artemisia*, *Asclepias*, *Avena*, *Axonopus*, *Borreria*, *Brachiaria*, *Brassica*, *Bromus*, *Chenopodium*, *Cirsium*, *Commelina*, *Convolvulus*, *Cynodon*, *Cyperus*, *Digitaria*, *Echinochloa*, *Eleusine*, *Elymus*, *Equisetum*, *Erodium*, *Helianthus*, *Imperata*, *Ipomoea*, *Kochia*, *Lolium*, *Malva*, *Oryza*, *Ottocloa*, *Panicum*, *Paspalum*, *Phalaris*, *Phragmites*, *Polygonum*, *Portulaca*, *Pteridium*, *Pueraria*, *Rubus*, *Salsola*, *Setaria*, *Sida*, *Sinapis*, *Sorghum*, *Triticum*, *Typha*, *Ulex*, *Xanthium*, and *Zea*. Non-limiting common types of plants that may be controlled in accordance with the invention include varieties of grasses, broad leafs, succulents, trees and shrubs, barley, black nightshade, broadleaf signal grass, burcumber, chickweed, common ragweed, crabgrass, field pennycress, rough fleabane, foxtail, giant ragweed, goose grass, groundcherry, hemp sesbarria, henbit, jungle rice, kochia, lambs quarters, morning-glory spp., mustard, fall and Texas panicum, palma amaranth, prickly sida (teaweed), red rice, rye, seedling shattercone, shepherd's purse, sicklepod, sprangletop, sunflower, velvet leaf, volunteer corn, common and tall waterhemp, wheat, wild proso millet, witchgrass, woolly cupgrass; and common perennial weeds including Canada thistle, common milkweed, field bindweed, hemp

dogbane, red vine, rhizome johnson grass, tall fescue, trumpet creeper, swamp smartweed and wisteria mukly. Star Thistle, Poison Oak, and Ivy.

Non-limiting examples of species that may be controlled include velvetleaf (*Abutilon theophrasti*), pigweed (*Amaranthus* spp.), buttonweed (*Borreria* spp.), oilseed rape, canola, indian mustard, etc. (*Brassica* spp.), commelina (*Commelina* spp.), filaree (*Erodium* spp.), sunflower (*Helianthus* spp.), morningglory (*Ipomoea* spp.), kochia (*Kochia scoparia*), mallow (*Malva* spp.), wild buckwheat, smartweed, etc. (*Polygonum* spp.), purslane (*Portulaca* spp.), russian thistle (*Salsola* spp.), sida (*Sida* spp.), wild mustard (*Sinapis arvensis*), cocklebur (*Xanthium* spp.), wild oat (*Avena fatua*), carpetgrass (*Axonopus* spp.), downy brome (*Bromus tectorum*), crabgrass (*Digitaria* spp.), barnyardgrass (*Echinochloa crus-galli*), goosegrass (*Eleusine indica*), annual ryegrass (*Lolium multiflorum*), rice (*Oryza sativa*), ottochloa (*Ottochloa nodosa*), bahiagrass (*Paspalum notatum*), canarygrass (*Phalaris* spp.), foxtail (*Setaria* spp.), wheat (*Triticum aestivum*), corn (*Zea mays*), mugwort (*Artemisia* spp.), milkweed (*Asclepias* spp.), canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), kudzu (*Pueraria* spp.), brachiaria (*Brachiaria* spp.), bermudagrass (*Cynodon dactylon*), yellow nutsedge (*Cyperus esculentus*), purple nutsedge (*C. rotundus*), quackgrass (*Elymus repens*), lalang (*Imperata cylindrica*), perennial ryegrass (*Lolium perenne*), guineagrass (*Panicum maximum*), dallisgrass (*Paspalum dilatatum*), reed (*Phragmites* spp.), johnsongrass (*Sorghum halepense*), cattail (*Typha* spp.), horsetail (*Equisetum* spp.), bracken (*Pteridium aquilinum*), blackberry (*Rubus* spp.) and gorse (*Ulex europaeus*).

Crop and other cultivated species may also be contacted with a composition of the invention. Non-limiting examples of cultivated plants include, but are not limited to, species from the genera *Fragaria*, *Lotus*, *Medicago*, *Onobrychis*, *Trifolium*, *Trigonella*, *Vigna*, *Citrus*, *Linum*, *Geranium*, *Manihot*, *Daucus*, *Arabidopsis*, *Brassica*, *Raphanus*, *Sinapis*, *Atropa*, *Capsicum*, *Datura*, *Hyoscyamus*, *Lycopersicon*, *Nicotiana*, *Helianthus*, *Lactuca*, *Bromus*, *Asparagus*, *Antirrhinum*, *Hemerocallis*, *Nemesia*, *Pelargonium*, *Panicum*, *Pennisetum*, *Ranunculus*, *Senecio*, *Salpiglossis*, *Cucumis*, *Bromelia*, *Glycine*, *Lolium*, *Zea*, *Triticum*, *Sorghum*, *Ipomoea*, *Passiflora*, *Cyclamen*, *Malus*, *Prunus*, *Rosa*, *Rubus*, *Populus*, *Santalum*, *Allium*, *Lilium*, *Narcissus*, *Ananas*, *Arachis*, *Phaseolus*, *Pisum*, *Oryza*, *Hordeum*, *Gossypium*.

A common class of plants exploited in agriculture are vegetable crops, including artichokes, kohlrabi, arugula, leeks, asparagus, lettuce (e.g., head, leaf, romaine), bok choy,

malanga, broccoli, melons (e.g., muskmelon, watermelon, crenshaw, honeydew, cantaloupe), brussels sprouts, cabbage, cardoni, carrots, napa, cauliflower, okra, onions, celery, parsley, chick peas, parsnips, chicory, Chinese cabbage, peppers, collards, potatoes, cucumber plants (marrows, cucumbers), pumpkins, cucurbits, radishes, dry bulb onions, rutabaga, eggplant, salsify, escarole, shallots, endive, garlic, spinach, green onions, squash, greens, beet (sugar beet and fodder beet), sweet potatoes, swiss-chard, horseradish, tomatoes, kale, turnips, and spices.

Other types of plants frequently finding commercial use include fruit and vine crops such as apples, apricots, cherries, nectarines, peaches, pears, plums, prunes, quince almonds, chestnuts, filberts, pecans, pistachios, walnuts, citrus, blueberries, boysenberries, cranberries, currants, loganberries, raspberries, strawberries, blackberries, grapes, avocados, bananas, kiwi, persimmons, pomegranate, pineapple, tropical fruits, pomes, melon, mango, papaya, and lychee.

Many of the most widely grown plants are field crop plants such as evening primrose, meadow foam, corn (field, sweet, popcorn), hops, jojoba, peanuts, rice, safflower, small grains (barley, oats, rye, wheat, etc.), sorghum, tobacco, kapok, leguminous plants (beans, lentils, peas, soybeans), oil plants (rape, mustard, poppy, olives, sunflowers, coconut, castor oil plants, cocoa beans, groundnuts), fiber plants (cotton, flax, hemp, jute), lauraceae (cinnamon, camphor), or plants such as coffee, sugarcane, tea, and natural rubber plants.

Another economically important group of plants are ornamental plants. Examples of commonly grown ornamental plants include alstroemeria (e.g., *Alstroemeria brasiliensis*), aster, azalea (e.g., *Rhododendron sp.*), begonias (e.g., *Begonia sp.*), bellflower, bouganvillea, cactus (e.g., *Cactaceae schlumbergera truncata*), camellia, carnation (e.g., *Dianthus caryophyllus*), chrysanthemums (e.g., *Chrysanthemum sp.*), clematis (e.g., *Clematis sp.*), cockscomb, columbine, cyclamen (e.g., *Cyclamen sp.*), daffodils (e.g., *Narcissus sp.*), false cypress, freesia (e.g., *Freesia refracta*), geraniums, gerberas, gladiolus (e.g., *Gladiolus sp.*), holly, hibiscus (e.g., *Hibiscus rosasanensis*), hydrangea (e.g., *Macrophylla hydrangea*), juniper, lilies (e.g., *Lilium sp.*), magnolia, miniroses, orchids (e.g., members of the family *Orchidaceae*), petunias (e.g., *Petunia hybrida*), poinsettia (e.g., *Euphorbia pulcherima*), primroses, rhododendron, roses (e.g., *Rosa sp.*), snapdragons (e.g., *Antirrhinum sp.*), shrubs, trees such as forest (broad-leaved trees and evergreens, such as conifers) and tulips (e.g., *Tulipa sp.*).



### III. Antibiotics

Another embodiment of the invention concerns methods and compositions for the contemporaneous administration of ectophosphatase inhibitors and antibiotics. Antibiotics are any chemical of natural or synthetic origin that kill or inhibit the growth of other types cells.

5 Many clinically-useful antibiotics are produced by microorganisms. Antibiotics are typically low molecular-weight (non-protein) molecules produced as secondary metabolites, mainly by microorganisms that live in the soil. Most of these microorganisms form some type of a spore or other dormant cell, and there is thought to be some relationship (besides temporal) between antibiotic production and the processes of sporulation. Among molds, the notable antibiotic

10 producers are *Penicillium* and *Cephalosporium*, which are the main source of the beta-lactam antibiotics (penicillin and its relatives). In the Bacteria, the Actinomycetes, notably *Streptomyces* species, produce a variety of types of antibiotics including the aminoglycosides (e.g. streptomycin), macrolides (e.g. erythromycin), and the tetracyclines. Endospore-forming *Bacillus* species produce polypeptide antibiotics such as polymyxin and bacitracin. The table

15 below (Table 1) is a summary of the classes of antibiotics and their properties including their biological sources.

As set forth in Table 2, certain aspects of the invention concern compositions comprising an ectophosphatase inhibitor and an antibiotic of a class selected from the group consisting of: beta-lactams (penicillins and cephalosporins); semisynthetic penicillin; clavulanic Acid;

20 monobactams; carboxypenems; aminoglycosides; glycopeptides; lincomycins; macrolides; polypeptides; chloramphenicol; polyenes; rifamycins; tetracyclines; and semisynthetic tetracycline. Any ectophosphatase inhibitor may be used in conjunction with these classes of antibiotics. In certain embodiments of the invention, the ectophosphatase inhibitor is selected from the group consisting of the compounds of formulas I-XX.

25

Table 2. Classes of antibiotics and their properties

Chemical class	Examples	Biological source	Spectrum (effective against)	Mode of action
Beta-lactams (penicillins and cephalosporins)	Penicillin G, Cephalothin	<i>Penicillium notatum</i> and <i>Cephalosporium</i> species	Gram-positive bacteria	Inhibits steps in cell wall (peptidoglycan) synthesis and murein assembly
Semisynthetic penicillin	Ampicillin, Amoxycillin		Gram-positive and Gram-negative bacteria	Inhibits steps in cell wall (peptidoglycan) synthesis and murein assembly
Clavulanic Acid	Clavamox is clavulanic acid plus amoxycillin	<i>Streptomyces clavuligerus</i>	Gram-positive and Gram-negative bacteria	Suicide inhibitor of beta-lactamases
Monobactams	Aztreonam	<i>Chromobacter violaceum</i>	Gram-positive and Gram-negative bacteria	Inhibits steps in cell wall (peptidoglycan) synthesis and murein assembly
Carboxypenems	Imipenem	<i>Streptomyces cattleya</i>	Gram-positive and Gram-negative bacteria	Inhibits steps in cell wall (peptidoglycan) synthesis and murein assembly
Aminoglycosides	Streptomycin  Gentamicin	<i>Streptomyces griseus</i>  <i>Micromonospora</i> species	Gram-positive and Gram-negative bacteria Gram-positive and Gram-negative bacteria esp. Pseudomonas	Inhibit translation (protein synthesis) Inhibit translation (protein synthesis)
Glycopeptides	Vancomycin	<i>Streptomyces orientales</i>	Gram-positive bacteria, esp. <i>Staphylococcus aureus</i>	Inhibits steps in murein (peptidoglycan) biosynthesis and assembly
Lincomycins	Clindamycin	<i>Streptomyces lincolnensis</i>	Gram-positive and Gram-negative bacteria esp. anaerobic Bacteroides	Inhibits translation (protein synthesis)

Chemical class	Examples	Biological source	Spectrum (effective against)	Mode of action
Macrolides	Erythromycin	<i>Streptomyces erythreus</i>	Gram-positive bacteria, Gram-negative bacteria not enterics, Neisseria, Legionella, Mycoplasma	Inhibits translation (protein synthesis)
Polypeptides	Polymyxin	<i>Bacillus polymyxa</i>	Gram-negative bacteria	Damages cytoplasmic membranes
	Bacitracin	<i>Bacillus subtilis</i>	Gram-positive bacteria	Inhibits steps in murein (peptidoglycan) biosynthesis and assembly
Polyenes	Amphotericin	<i>Streptomyces nodosus</i>	Fungi	Inactivate membranes containing sterols
Rifamycins	Nystatin	<i>Streptomyces noursei</i>	Fungi (Candida)	Inactivate membranes containing sterols
	Rifampicin	<i>Streptomyces mediterranei</i>	Gram-positive and Gram-negative bacteria, Mycobacterium tuberculosis	Inhibits transcription (eubacterial RNA polymerase)
Tetracyclines	Tetracycline	<i>Streptomyces</i> species	Gram-positive and Gram-negative bacteria, Rickettsias	Inhibit translation (protein synthesis)
Semisynthetic tetracycline	Doxycycline		Gram-positive and Gram-negative bacteria, Rickettsias Ehrlichia, Borellia	Inhibit translation (protein synthesis)
Chloramphenicol	Chloramphenicol	<i>Streptomyces venezuelae</i>	Gram-positive and Gram-negative bacteria	Inhibits translation (protein synthesis)

### **A. Antimicrobial Agents Used in the Treatment of Infectious Disease**

An important property of a clinically-useful antimicrobial agent, especially from the patient's point of view, is its selective toxicity, *i.e.*, that the agent acts in some way that inhibits or kills bacterial pathogens but has little or no toxic effect on the animal taking the drug. This implies that the biochemical processes in the bacteria are in some way different from those in the animal cells, and that the advantage of this difference can be taken in chemotherapy. Antibiotics may have a cidal (killing) effect or a static (inhibitory) effect on a range of microbes. The range of bacteria or other microorganisms that are affected by a certain antibiotic are is expressed as its spectrum of action. Antibiotics effective against prokaryotes which kill or inhibit a wide range of Gram-positive and Gram-negative bacteria are said to be broad spectrum. If effective mainly against Gram-positive or Gram-negative bacteria, they are narrow spectrum. If effective against a single organism or disease, they are referred to as limited spectrum. In accordance with the invention, certain adverse effects of antibiotics may be minimized by use of an ectophosphatase inhibitor in combination with the antibiotic, thereby allowing use of lower doses of antibiotics.

### **B. Kinds of Antimicrobial Agents and their Primary Modes of Action**

In one embodiment of the invention, ectophosphatase inhibitors are used in conjunction with cell wall synthesis inhibitors. Cell wall synthesis inhibitors generally inhibit some step in the synthesis of bacterial peptidoglycan. Generally they exert their selective toxicity against eubacteria because human cells lack cell walls.

Beta lactam antibiotics contain a 4-membered beta lactam ring. They are the products of two groups of fungi, *Penicillium* and *Cephalosporium* molds, and are correspondingly represented by the penicillins and cephalosporins. The beta lactam antibiotics inhibit the last step in peptidoglycan synthesis, the final cross-linking between peptide side chains, mediated by bacterial carboxypeptidase and transpeptidase enzymes. Beta lactam antibiotics are normally bactericidal and require that cells be actively growing in order to exert their toxicity.

Natural penicillins, such as Penicillin G or Penicillin V, are produced by fermentation of *Penicillium chrysogenum*. They are effective against streptococcus, gonococcus and staphylococcus, except where resistance has developed. They are considered narrow spectrum since they are not effective against Gram-negative rods.

Semisynthetic penicillins date to 1959. Mold produces a main part of the penicillin molecule (6-aminopenicillanic acid) which can be modified chemically by the addition of side chains. Many of these compounds have been developed to have distinct benefits or advantages over penicillin G, such as increased spectrum of activity (effectiveness against Gram-negative rods), resistance to penicillinase, effectiveness when administered orally, etc. Amoxycillin and Ampicillin have broadened spectra against Gram-negatives and are effective orally; Methicillin is penicillinase-resistant.

Clavulanic acid is a chemical sometimes added to a semisynthetic penicillin preparation. Thus, amoxycillin plus clavulanate is clavamox or augmentin. The clavulanate is not an antimicrobial agent. It inhibits beta lactamase enzymes and has given extended life to penicillinase-sensitive beta lactams.

Although nontoxic, penicillins occasionally cause death when administered to persons who are allergic to them. In the U.S. there are 300 - 500 deaths annually due to penicillin allergy. In allergic individuals the beta lactam molecule attaches to a serum protein which initiates an IgE-mediated inflammatory response.

Cephalosporins are beta lactam antibiotics with a similar mode of action to penicillins that are produced by species of *Cephalosporium*. They have a low toxicity and a somewhat broader spectrum than natural penicillins. They are often used as penicillin substitutes, against Gram-negative bacteria, and in surgical prophylaxis. They are subject to degradation by some bacterial beta-lactamases, but they tend to be resistant to beta-lactamases from *S. aureus*.

Bacitracin is a polypeptide antibiotic produced by *Bacillus* species. It prevents cell wall growth by inhibiting the release of the mucopeptide subunits of peptidoglycan from the lipid carrier molecule that carries the subunit to the outside of the membrane. Teichoic acid synthesis, which requires the same carrier, is also inhibited. Bacitracin has a high toxicity which precludes its systemic use. It is present in many topical antibiotic preparations, and since it is not absorbed by the gut, it is given to "sterilize" the bowel prior to surgery.

Cell membrane inhibitors disorganize the structure or inhibit the function of bacterial membranes. The integrity of the cytoplasmic and outer membranes is vital to bacteria, and compounds that disorganize the membranes rapidly kill the cells. However, due to the similarities in phospholipids in eubacterial and eukaryotic membranes, this action is rarely

specific enough to permit these compounds to be used systemically. The only antibacterial antibiotic of clinical importance that acts by this mechanism is Polymyxin, produced by *Bacillus polymyxis*. Polymyxin is effective mainly against Gram-negative bacteria and is usually limited to topical usage. Polymyxins bind to membrane phospholipids and thereby interfere with membrane function. Polymyxin is occasionally given for urinary tract infections caused by *Pseudomonas* that are gentamicin, carbenicillin and tobramycin resistant. The balance between effectiveness and damage to the kidney and other organs is dangerously close, and the drug should only be given under close supervision in the hospital.

In accordance with the invention, ectophosphatase inhibitors may also be contemporaneously administered and formulated in compositions with antibiotics that are protein synthesis inhibitors. Many therapeutically useful antibiotics inhibit some step in the complex process of translation. The attack is at one of the events occurring on the ribosome, rather than the stage of amino acid activation or attachment to a particular tRNA. Most have an affinity or specificity for 70S (as opposed to 80S) ribosomes, and they achieve their selective toxicity in this manner. The most important antibiotics with this mode of action are the tetracyclines, chloramphenicol, the macrolides (e.g. erythromycin) and the aminoglycosides (e.g. streptomycin).

The aminoglycosides are products of *Streptomyces* species and are represented by streptomycin, kanamycin, tobramycin and gentamicin. These antibiotics exert their activity by binding to bacterial ribosomes and preventing the initiation of protein synthesis. Aminoglycosides have been used against a wide variety of bacterial infections caused by Gram-positive and Gram-negative bacteria. Streptomycin has been used extensively as a primary drug in the treatment of tuberculosis. Gentamicin is active against many strains of Gram-positive and Gram-negative bacteria, including some strains of *Pseudomonas aeruginosa*. Kanamycin (a complex of three antibiotics, A, B and C) is active at low concentrations against many Gram-positive bacteria, including penicillin-resistant staphylococci. Gentamicin and Tobramycin are mainstays for treatment of *Pseudomonas* infections. An unfortunate side effect of aminoglycosides has tended to restrict their usage: prolonged use is known to impair kidney function and cause damage to the auditory nerves leading to deafness.

The tetracyclines consist of eight related antibiotics which are all natural products of *Streptomyces*, although some can now be produced semisynthetically. Tetracycline,

chlortetracycline and doxycycline are the best known. The tetracyclines are broad-spectrum antibiotics with a wide range of activity against both Gram-positive and Gram-negative bacteria. The tetracyclines act by blocking the binding of aminoacyl tRNA to the A site on the ribosome. Tetracyclines inhibit protein synthesis on isolated 70S or 80S (eukaryotic) ribosomes, and in both cases, their effect is on the small ribosomal subunit. However, most bacteria possess an active transport system for tetracycline that will allow intracellular accumulation of the antibiotic at concentrations 50 times as great as that in the medium. This greatly enhances its antibacterial effectiveness and accounts for its specificity of action, since an effective concentration cannot be accumulated in animal cells. Thus a blood level of tetracycline which is harmless

The tetracyclines have a remarkably low toxicity and minimal side effects when taken by animals. The combination of their broad spectrum and low toxicity has led to their overuse and misuse by the medical community and the wide-spread development of resistance has reduced their effectiveness. Nonetheless, tetracyclines still have some important uses, such as in the treatment of Lyme disease.

Chloramphenicol has a broad spectrum of activity but it exerts a bacteriostatic effect. It is effective against intracellular parasites such as the rickettsiae. Unfortunately, aplastic anemia, which is dose related develops in a small proportion (1/50,000) of patients. Chloramphenicol was originally discovered and purified from the fermentation of a *Streptomyces*, but currently it is produced entirely by chemical synthesis. Chloramphenicol inhibits the bacterial enzyme peptidyl transferase thereby preventing the growth of the polypeptide chain during protein synthesis.

Chloramphenicol is entirely selective for 70S ribosomes and does not affect 80S ribosomes. Its unfortunate toxicity towards the small proportion of patients who receive it is in no way related to its effect on bacterial protein synthesis. However, since mitochondria probably originated from prokaryotic cells and have 70S ribosomes, they are subject to inhibition by some of the protein synthesis inhibitors including chloramphenicol. This likely explains the toxicity of chloramphenicol. The eukaryotic cells most likely to be inhibited by chloramphenicol are those undergoing rapid multiplication, thereby rapidly synthesizing mitochondria. Such cells include the blood forming cells of the bone marrow, the inhibition of which could present as aplastic anemia. Chloramphenicol was once a highly prescribed antibiotic and a number of

deaths from anemia occurred before its use was curtailed. Now it is seldom used in human medicine except in life-threatening situations (e.g. typhoid fever).

5 The Macrolides are a family of antibiotics whose structures contain large lactone rings linked through glycoside bonds with amino sugars. The most important members of the group are erythromycin and oleandomycin. Erythromycin is active against most Gram-positive bacteria, *Neisseria*, *Legionella* and *Haemophilus*, but not against the Enterobacteriaceae. Macrolides inhibit bacterial protein synthesis by binding to the 50S ribosomal subunit. Binding inhibits elongation of the protein by peptidyl transferase or prevents translocation of the ribosome or both. Macrolides are bacteriostatic for most bacteria but are cidal for a few Gram-  
10 positive bacteria.

In further embodiments of the invention, ectophosphatase inhibitors may be contemporaneously administered and formulated in compositions with antibiotics that affect nucleic acids, including chemotherapeutic agents that affect the synthesis of DNA or RNA, or can bind to DNA or RNA so that their messages cannot be read. In either case, this can block  
15 the growth of cells. The majority of these drugs are unselective, however, and affect animal cells and bacterial cells alike and therefore have no therapeutic application. Two nucleic acid synthesis inhibitors which have selective activity against prokaryotes and some medical utility are nalidixic acid and rifamycins.

Nalidixic acid is a synthetic chemotherapeutic agent which has activity mainly against  
20 Gram-negative bacteria. Nalidixic acid belongs to a group of compounds called quinolones. Nalidixic acid is a bactericidal agent that binds to the DNA gyrase enzyme (topoisomerase) which is essential for DNA replication and allows supercoils to be relaxed and reformed. Binding of the drug inhibits DNA gyrase activity.

Some quinolones penetrate macrophages and neutrophils better than most antibiotics and  
25 are thus useful in treatment of infections caused by intracellular parasites. However, the main use of nalidixic acid is in treatment of lower urinary tract infections (UTI). The compound is unusual in that it is effective against several types of Gram-negative bacteria such as *E. coli*, *Enterobacter aerogenes*, *K. pneumoniae* and *Proteus* species which are common causes of UTI. It is not usually effective against *Pseudomonas aeruginosa*, and Gram-positive bacteria are  
30 resistant.



The rifamycins are also the products of *Streptomyces*. Rifampicin is a semisynthetic derivative of rifamycin that is active against Gram-positive bacteria (including *Mycobacterium tuberculosis*) and some Gram-negative bacteria. Rifampicin acts quite specifically on eubacterial RNA polymerase and is inactive towards RNA polymerase from animal cells or towards DNA polymerase. The antibiotic binds to the beta subunit of the polymerase and apparently blocks the entry of the first nucleotide which is necessary to activate the polymerase, thereby blocking mRNA synthesis. It has been found to have greater bactericidal effect against *M. tuberculosis* than other anti-tuberculosis drugs, and it has largely replaced isoniazid as one of the front-line drugs used to treat the disease, especially when isoniazid resistance is indicated. It is effective orally and penetrates well into the cerebrospinal fluid and is therefore useful for treatment of tuberculosis meningitis and meningitis caused by *Neisseria meningitidis*.

In accordance with the invention, ectophosphatase inhibitors may also be administered with competitive inhibitors, including mostly all synthetic chemotherapeutic agents. Most are "growth factor analogs" which are structurally similar to a bacterial growth factor but which do not fulfill its metabolic function in the cell. Some are bacteriostatic and some are bactericidal.

Sulfonamides were originally introduced as chemotherapeutic agents, one of which, prontosil, had the effect of curing mice with infections caused by beta-hemolytic streptococci. Chemical modifications of the compound sulfanilamide gave compounds with even higher and broader antibacterial activity. The resulting sulfonamides have broadly similar antibacterial activity, but differ widely in their pharmacological actions. Bacteria which are almost always sensitive to the sulfonamides include *Streptococcus pneumoniae*, beta-hemolytic streptococci and *E. coli*. The sulfonamides have been extremely useful in the treatment of uncomplicated UTI caused by *E. coli*, and in the treatment of meningococcal meningitis, because they cross the blood-brain barrier.

The sulfonamides (e.g. Gantrisin) and Trimethoprim are inhibitors of the bacterial enzymes required for the synthesis of tetrahydrofolic acid (THF), the vitamin form of folic acid essential for 1-carbon transfer reactions. Sulfonamides are structurally similar to para aminobenzoic acid (PABA), the substrate for the first enzyme in the THF pathway, and they competitively inhibit that step. Trimethoprim is structurally similar to dihydrofolate (DHF) and competitively inhibits the second step in THF synthesis mediated by the DHF reductase. Animal cells do not synthesize their own folic acid but obtain it in a preformed fashion as a vitamin.

Since animals do not make folic acid, they are not affected by these drugs, which achieve their selective toxicity for bacteria on this basis.

Three additional synthetic chemotherapeutic agents have been used in the treatment of tuberculosis: isoniazid (INH), paraaminosalicylic acid (PAS), and ethambutol. The usual strategy in the treatment of tuberculosis has been to administer a single antibiotic (historically streptomycin, but now, most commonly, rifampicin is given) in conjunction with INH and ethambutol. Since the tubercle bacillus rapidly develops resistance to the antibiotic, ethambutol and INH are given to prevent outgrowth of a resistant strain. It must also be pointed out that the tubercle bacillus rapidly develops resistance to ethambutol and INH if either drug is used alone. Ethambutol inhibits incorporation of mycolic acids into the mycobacterial cell wall. Isoniazid has been reported to inhibit mycolic acid synthesis in mycobacteria and since it is an analog of pyridoxine (Vitamin B6) it may inhibit pyridoxine catalyzed reactions as well. Isoniazid is activated by a mycobacterial peroxidase enzyme and destroys several targets in the cell. PAS is an anti-folate. PAS was once a primary anti-tuberculosis drug, but now it is a secondary agent, having been largely replaced by ethambutol.

### C. Inhibition of Drug Resistance in Microorganisms to Treat Infection

The present invention also relates to methods for inhibiting or ameliorating infection in animals and humans caused by microorganisms. For example, treatment of bacterial and fungal infections may be augmented or effected using inhibitory mechanisms against an ectophosphatase to modify the ATP gradient across biological membranes. The invention is useful in the inhibition or amelioration of a wide range of infections including, but not limited to, gram negative bacterial infection including gram-negative sepsis, gram-negative endotoxin-related hypotension and shock, rabies, cholera, tetanus, lymes disease, tuberculosis, *Candida albicans*, *Chlamydia*, etc.

The inhibition or amelioration of the infections may involve the administration of an anti-microbial agent (such as an antibiotic or an antifungal agent) with the concurrent administration of the aforementioned compositions. Additionally, inhibitors of ectophosphatases or ABC transporters may be administered via a physiologically acceptable carrier as described above. In one embodiment of the invention, the inhibitor of ectophosphatase is selected from the compounds represented by formulas I-XX.

Certain aspects of the current invention thus concern the inhibition of cell growth by contacting a cell with an inhibitor of an ectophosphatase with contemporaneous administration of other agents capable of inhibiting cell growth or killing the cell. In this manner, therapeutic benefit may be obtained for the treatment of bacterial infections. Examples of types of bacteria that could be inhibited and bacterial infections that could potentially be treated or prevented with the invention, include, but are not limited to, the 83 or more distinct serotypes of pneumococci, streptococci such as *S. pyogenes*, *S. agalactiae*, *S. equi*, *S. canis*, *S. bovis*, *S. equinus*, *S. anginosus*, *S. sanguis*, *S. salivarius*, *S. mitis*, *S. mutans*, other viridans streptococci, peptostreptococci, other related species of streptococci, enterococci such as *Enterococcus faecalis*, *Enterococcus faecium*, Staphylococci, such as *Staphylococcus epidermidis*, *Staphylococcus aureus*, particularly in the nasopharynx, *Hemophilus influenzae*, pseudomonas species such as *Pseudomonas aeruginosa*, *Pseudomonas pseudomallei*, *Pseudomonas mallei*, brucellas such as *Brucella melitensis*, *Brucella suis*, *Brucella abortus*, *Bordetella pertussis*, *Neisseria meningitidis*, *Neisseria gonorrhoeae*, *Moraxella catarrhalis*, *Corynebacterium diphtheriae*, *Corynebacterium ulcerans*, *Corynebacterium pseudotuberculosis*, *Corynebacterium pseudodiphtheriticum*, *Corynebacterium urealyticum*, *Corynebacterium hemolyticum*, *Corynebacterium equi*, etc. *Listeria monocytogenes*, *Nocardia asteroides*, Bacteroides species, Actinomycetes species, *Treponema pallidum*, Leptospirous species and related organisms. The invention may also find use, for example, against gram negative bacteria such as *Klebsiella pneumoniae*, *Escherichia coli*, *Proteus*, *Serratia* species, *Acinetobacter*, *Yersinia pestis*, *Francisella tularensis*, *Enterobacter* species, *Bacteriodes* and *Legionella* species and the like.

#### IV. Chemotherapeutics

A variety of chemotherapeutic agents are suitable for use with the invention and are known to those of skill in the art. In accordance with the invention, therapeutic benefit may be obtained by contemporaneous administration of one or more ectophosphatase inhibitor and one or more such chemotherapeutic agent(s). Co-administration of chemotherapeutics with ectophosphatase inhibitors in accordance with the invention may be used to increase therapeutic effectiveness of a chemotherapeutic and may allow use of lowered doses. Such techniques may further allow treatment of chemotherapy-resistant tumor cells.

As will be understood by those of ordinary skill in the art, the appropriate doses of chemotherapeutic agents will be generally around those already employed in clinical therapies wherein the chemotherapeutics are administered alone or in combination with other chemotherapeutics. By way of example only, agents such as cisplatin, and other DNA alkylating agents may be used with an ectophosphatase inhibitor. Cisplatin has been widely used to treat cancer, with efficacious doses used in clinical applications of 20 mg/m<sup>2</sup> for 5 days every three weeks for a total of three courses. Cisplatin is not absorbed orally and must therefore be delivered via injection intravenously, subcutaneously, intratumorally or intraperitoneally.

Further agents for use with ectophosphatase inhibitors in accordance with the invention include, for example, compounds that interfere with DNA replication, mitosis and chromosomal segregation. Such chemotherapeutic compounds include adriamycin, also known as doxorubicin, etoposide, verapamil, podophyllotoxin, and the like. Widely used in a clinical setting for the treatment of neoplasms, these compounds are administered through bolus injections intravenously at doses ranging from 25-75 mg/m<sup>2</sup> at 21 day intervals for adriamycin, to 35-50 mg/m<sup>2</sup> for etoposide intravenously or double the intravenous dose orally.

Agents that disrupt the synthesis and fidelity of polynucleotide precursors also may be used with ectophosphatase inhibitors. Particularly useful are agents that have undergone extensive testing and are readily available. As such, agents such as 5-fluorouracil (5-FU) are preferentially used by neoplastic tissue, making this agent particularly useful for targeting to neoplastic cells. Although quite toxic, 5-FU is applicable in a wide range of carriers, including topical, with intravenous administration in doses ranging from 3 to 15 mg/kg/day being commonly used.

Exemplary and non-limiting chemotherapeutic agents for use in combination with an ectophosphatase inhibitor in accordance with the invention are listed in Table 3. Accordingly, compositions comprising these agents and one or more ectophosphatase inhibitor(s) form one part of the invention, as do methods for the administration thereof. Each of the agents listed below are exemplary and by no means limiting. In this regard, the skilled artisan is directed to "Remington's Pharmaceutical Sciences" 15th Edition, chapter 33, in particular pages 624-652. Some variation in dosage will necessarily occur depending on the condition of the subject being treated. The person responsible for administration will, in any event, determine the appropriate dose for the individual subject. Moreover, for human administration, preparations should meet

sterility, pyrogenicity, general safety and purity standards as required by FDA Office of Biologics standards.

Specifically contemplated by the inventors are compositions comprising and ectophosphatase inhibitor and a chemotherapeutic agent set forth in Table 3., as well as methods comprising the use thereof

**Table 3: Chemotherapeutic Agents Useful In Neoplastic Disease**

CLASS	TYPE OF AGENT	NONPROPRIETARY NAMES (OTHER NAMES)	DISEASE
		Mechlorethamine (HN <sub>2</sub> )	Hodgkin's disease, non-Hodgkin's lymphomas
	Nitrogen Mustards	Cyclophosphamide Ifosfamide	Acute and chronic lymphocytic leukemias, Hodgkin's disease, non-Hodgkin's lymphomas, multiple myeloma, neuroblastoma, breast, ovary, lung, Wilms' tumor, cervix, testis, soft-tissue sarcomas
		Melphalan (L-sarcolysin)	Multiple myeloma, breast, ovary
		Chlorambucil	Chronic lymphocytic leukemia, primary macroglobulinemia, Hodgkin's disease, non-Hodgkin's lymphomas
Alkylating Agents	Ethylenimenes and Methylmelamines	Hexamethylmelamine	Ovary
		Thiotepa	Bladder, breast, ovary
	Alkyl Sulfonates	Busulfan	Chronic granulocytic leukemia
		Carmustine (BCNU)	Hodgkin's disease, non-Hodgkin's lymphomas, primary brain tumors, multiple myeloma, malignant melanoma
	Nitrosoureas	Lomustine (CCNU)	Hodgkin's disease, non-Hodgkin's lymphomas, primary brain tumors, small-cell lung

CLASS	TYPE OF AGENT	NONPROPRIETARY NAMES (OTHER NAMES)	DISEASE
		Semustine (methyl-CCNU)	Primary brain tumors, stomach, colon
		Streptozocin (streptozotocin)	Malignant pancreatic insulinoma, malignant carcinoid
	Triazines	Dacarbazine (DTIC; dimethyltriazenoimidaz olecarboxamide)	Malignant melanoma, Hodgkin's disease, soft-tissue sarcomas
Antimetabolites	Folic Acid Analogues	Methotrexate (amethopterin)	Acute lymphocytic leukemia, choriocarcinoma, mycosis fungoides, breast, head and neck, lung, osteogenic sarcoma
	Pyrimidine Analogues	Fluouracil (5-fluorouracil; 5-FU) Floxuridine (fluorode-oxyuridine; FUdR)	Breast, colon, stomach, pancreas, ovary, head and neck, urinary bladder, pre-malignant skin lesions (topical)
Antimetabolites, continued		Cytarabine (cytosine arabioside)	Acute granulocytic and acute lymphocytic leukemias
		Mercaptopurine (6-mercaptopurine; 6-MP)	Acute lymphocytic, acute granulocytic and chronic granulocytic leukemias
	Purine Analogues and Related Inhibitors	Thioguanine (6-thioguanine; TG)	Acute granulocytic, acute lymphocytic and chronic granulocytic leukemias
		Pentostatin (2-deoxycoformycin)	Hairy cell leukemia, mycosis fungoides, chronic lymphocytic leukemia
		Vinblastine (VLB)	Hodgkin's disease, non-Hodgkin's lymphomas, breast, testis
	Vinca Alkaloids	Vincristine	Acute lymphocytic leukemia, neuroblastoma, Wilms' tumor, rhabdomyosarcoma, Hodgkin's disease, non-Hodgkin's lymphomas, small-cell lung
	Epipodophyllotoxins	Etoposide Tertiposide	Testis, small-cell lung and other lung, breast, Hodgkin's disease, non-Hodgkin's lymphomas, acute granulocytic leukemia, Kaposi's sarcoma

CLASS	TYPE OF AGENT	NONPROPRIETARY NAMES (OTHER NAMES)	DISEASE
Natural Products		Dactinomycin (actinomycin D)	Choriocarcinoma, Wilms' tumor, rhabdomyosarcoma, testis, Kaposi's sarcoma
		Daunorubicin (daunomycin; rubidomycin)	Acute granulocytic and acute lymphocytic leukemias
	Antibiotics	Doxorubicin	Soft-tissue, osteogenic and other sarcomas; Hodgkin's disease, non-Hodgkin's lymphomas, acute leukemias, breast, genitourinary, thyroid, lung, stomach, neuroblastoma
		Bleomycin	Testis, head and neck, skin, esophagus, lung and genitourinary tract; Hodgkin's disease, non-Hodgkin's lymphomas
	Antibiotics, continued	Plicamycin (mithramycin)	Testis, malignant hypercalcemia
Natural Products, continued		Mitomycin (mitomycin C)	Stomach, cervix, colon, breast, pancreas, bladder, head and neck
	Enzymes	L-Asparaginase	Acute lymphocytic leukemia
	Biological Response Modifiers	Interferon alfa	Hairy cell leukemia., Kaposi's sarcoma, melanoma, carcinoid, renal cell, ovary, bladder, non-Hodgkin's lymphomas, mycosis fungoides, multiple myeloma, chronic granulocytic leukemia
	Platinum Coordination Complexes	Cisplatin (cis-DDP) Carboplatin	Testis, ovary, bladder, head and neck, lung, thyroid, cervix, endometrium, neuroblastoma, osteogenic sarcoma
	Anthracenedione	Mitoxantrone	Acute granulocytic leukemia, breast
Miscellaneous Agents	Substituted Urea	Hydroxyurea	Chronic granulocytic leukemia, polycythemia vera, essential thrombocytosis, malignant melanoma
	Methyl Hydrazine Derivative	Procarbazine (N-methylhydrazine, MIH)	Hodgkin's disease
	Adrenocortical	Mitotane (o,p'-DDD)	Adrenal cortex

CLASS	TYPE OF AGENT	NONPROPRIETARY NAMES (OTHER NAMES)	DISEASE
	Suppressant	Aminoglutethimide	Breast
	Adrenocorticost eroids	Prednisone (several other equivalent preparations available)	Acute and chronic lymphocytic leukemias, non-Hodgkin's lymphomas, Hodgkin's disease, breast
Hormones and Antagonists	Progestins	Hydroxyprogesterone caproate Medroxyprogesterone acetate Megestrol acetate	Endometrium, breast
	Estrogens	Diethylstilbestrol Ethinyl estradiol (other preparations available)	Breast, prostate
	Antiestrogen	Tamoxifen	Breast
	Androgens	Testosterone propionate Fluoxymesterone (other preparations available)	Breast
	Antiandrogen	Flutamide	Prostate
	Gonadotropin-re leasing hormone analog	Leuprolide	Prostate

Administration of compositions provided by the invention may be local or systemic, using a suitable physiological carrier. Other compounds which aid in the uptake or stability of these agents, or which have beneficial activity, may also be included in the formulations of the invention. Certain embodiments of the invention thus provide pharmaceutical composition comprising an ectophosphatase inhibitor. The composition may further comprise, in certain embodiments, a cytotoxic agent, including a chemotherapeutic agent set forth herein. For example, by contacting a tumor cell either alone with the ectophosphatase inhibitor or in combination with one or more chemotherapeutic agents, therapeutic benefit may be obtained. Particular benefit may be obtained where a tumor cell is resistant to at least one chemotherapeutic agent. This may enhance the overall anti-tumor activity achieved by therapy, and/or may be used to prevent or combat multi-drug tumor resistance.



## V. Assays and Methods for Screening Active Compounds

5 In one embodiment of the invention, assays are provided for screening compositions comprising combinations of ectophosphatase inhibitors and a selected cytotoxic agent, for example, a herbicide, fungicide, antibiotic, insecticide or chemotherapeutic agent. A number of assay formats are known to those of skill in the art and may be used in this regard. These include assays of biological activities as well as assays of chemical properties. The results of these assays provide important inferences as to the properties of compounds as well as their potential applications in treating human or other mammalian patients for infection and hyperproliferative diseases as well as in various agricultural applications. Assays deemed to be of particular utility in this regard include *in vivo* and *in vitro* screens of activity and immunoassays.

### (i) *Screening for Herbicidal Activity*

15 One aspect of the current invention provides herbicidal compositions having improved herbicidal activity. In accordance with the invention, assays for herbicidal activity may be used to assess the relative efficacy of combinations of ectophosphatase inhibitors and herbicidal agents. Numerous assay formats for analyzing herbicidal activity are known to those of skill in the art and may be used in this regard. A straightforward means for testing activity comprises the serial application of test compositions to plants and/or plant parts, for example, by leaf painting. Plants are otherwise grown under comparable conditions, followed by serial applications of test and control compositions are applied. Control treatments may be used comprising herbicide compositions lacking ectophosphatase inhibitors, thereby identifying the presence or absence of activity as a synergist. Herbicidal activity is then measured by analysis of the effect of the composition on plant viability.

25 Commercial herbicide formulations are well known to those of skill in the art and will generally be used in assays. However, it will typically be preferred to dilute herbicidal compositions and/or administer reduced amounts of the compositions such that the relative herbicidal activity of a composition may be quantified. Reductions in the lethality of herbicidal compositions allows the identification of effectiveness between herbicidal compositions. Thus, in particular embodiments of the invention, test and control compositions are administered in rates and/or amounts of from about 90% to about 5% of the commercial application rate for a given herbicide.

Following application of herbicidal test compositions, herbicidal activity and effectiveness is measured. Through comparisons with applications of control compositions, the effectiveness of the compositions may be determined.

Tests may be carried out on whole plants as well as plant parts or cell. For example, plant cells in tissue culture may be screened for herbicidal activity. The preparation of plant tissue cultures is well known to those of skill in the art.

(ii) *In vivo Assays*

The present invention encompasses the use of various animal models. Here, the identity seen between human and mouse provides an excellent opportunity to examine the function of a potential therapeutic agent, for example, an antiinfective or chemotherapeutic administered in combination with an ectophosphatase inhibitor. In the case of chemotherapeutics, one can utilize cancer models in mice that will be highly predictive of cancers in humans and other mammals. These models may employ the orthotopic or systemic administration of tumor cells to mimic primary and/or metastatic cancers. Alternatively, one may induce cancers in animals by providing agents known to be responsible for certain events associated with malignant transformation and/or tumor progression. Similarly, numerous animal models are available for analysis of antinfectives, including insecticides, antibiotics and antifungal agents. In this manner, all that is commonly required is infection of the relevant animal with a target infective agent and analysis of therapeutic benefit relative to prior antiinfective compositions.

Treatment of animals with test compositions will involve the administration of the composition, in an appropriate form, to the animal. Administration will be by any route the could be utilized for clinical or non-clinical purposes, including but not limited to oral, nasal, buccal, rectal, vaginal or topical. Alternatively, administration may be by intratracheal instillation, bronchial instillation, intradermal, subcutaneous, intramuscular, intraperitoneal or intravenous injection. Specifically contemplated are systemic intravenous injection, regional administration via blood or lymph supply and intratumoral injection.

Determining the effectiveness of a compound *in vivo* may involve a variety of different criteria. Such criteria include, but are not limited to, survival, reduction of tumor burden or mass, arrest or slowing of tumor progression, elimination of tumors, inhibition or prevention of metastasis, increased activity level, improvement in immune effector function and improved

food intake. Through comparisons of active agents alone and active agents in combination with ectophosphatase inhibitors, synergistic combinations may be readily confirmed.

(iii) *Confirmatory In vivo and Clinical Studies*

It will be understood by those of skill in the art that therapeutic compositions should generally be tested in an *in vivo* setting prior to use in a human subject. Such pre-clinical testing in animals is routine in the art. To conduct such confirmatory tests, all that is required is an art-accepted animal model of the disease in question, such as an animal bearing a solid tumor or infective agent. Any animal may be used in such a context, such as, *e.g.*, a mouse, rat, guinea pig, hamster, rabbit, dog, chimpanzee, or such like. Studies using small animals such as mice are widely accepted as being predictive of clinical efficacy in humans, and such animal models may thus find use in the context of the present invention as they are readily available and relatively inexpensive, at least in comparison to other experimental animals.

The manner of conducting an experimental animal test will be straightforward to those of ordinary skill in the art. All that is required to conduct such a test is to establish equivalent treatment groups, and to administer the test compounds to one group while various control studies are conducted in parallel on the equivalent animals in the remaining group or groups. One monitors the animals during the course of the study and, ultimately, one sacrifices the animals to analyze the effects of the treatment.

In the context of the treatment of tumors, it is contemplated that effective amounts of chemotherapeutic compositions will be those that generally result in at least about 10% of the cells within a tumor exhibiting cell death or apoptosis. Preferably, at least about 20%, about 30%, about 40%, or about 50%, of the cells at a particular tumor site will be killed. Most preferably, 100% of the cells at a tumor site will be killed.

The extent of cell death in a tumor is assessed relative to the maintenance of healthy tissues in all of the areas of the body. It will be preferable to use doses of chemotherapeutic compositions capable of inducing at least about 60%, about 70%, about 80%, about 85%, about 90%, about 95% up to and including 100% tumor necrosis, so long as the doses used do not result in significant side effects or other untoward reactions in the animal. All such determinations can be readily made and properly assessed by those of ordinary skill in the art. For example, attendants, scientists and physicians can utilize such data from experimental

animals in the optimization of appropriate doses for human treatment. In subjects with advanced disease, a certain degree of side effects can be tolerated. However, patients in the early stages of disease can be treated with more moderate doses in order to obtain a significant therapeutic effect in the absence of side effects. The effects observed in such experimental animal studies should preferably be statistically significant over the control levels and should be reproducible from study to study.

Those of ordinary skill in the art will further understand that combinations and doses of the compositions provided by the invention that result in tumor-specific necrosis towards the lower end of the effective ranges may nonetheless still be useful in connection with the present invention. For example, in embodiments where a continued application of the active agents is contemplated, an initial dose that results in only about 10% necrosis will nonetheless be useful, particularly as it is often observed that this initial reduction "primes" the tumor to further destructive assault upon subsequent re-application of the therapy. In any event, even if upwards of about 40% or so tumor inhibition is not ultimately achieved, it will be understood that any induction of thrombosis and necrosis is nonetheless useful in that it represents an advance over the state of the patients prior to treatments. Still further, it is contemplated that a dose which prevents or decreases the likelihood of either metastasis or *de novo* carcinogenesis would also be of therapeutic benefit to a patient receiving the treatment.

As discussed above in connection with the *in vitro* test system, it will naturally be understood that combinations of agents intended for use together should be tested and optimized together. The compositions of the invention can be straightforwardly analyzed in the combinations set forth herein. Analysis of the combined effects of such agents would be determined and assessed according to the guidelines set forth above.

(iv) *In vitro* Assays

In one embodiment of the invention, screening of a composition provided by the invention is conducted *in vitro* to identify those compounds capable of synergizing therapeutic agents, including cytotoxic agents such as antibiotics, fungicides and chemotherapeutic agents, as well as other types of biologically-active agents. In the case of killing of tumor cells, cytotoxicity is generally exhibited by necrosis or apoptosis. Necrosis is a relatively common pathway triggered by external signals. During this process, the integrity of the cellular membrane and cellular compartments is lost. On the other hand, apoptosis, or programmed cell

death, is a highly organized process of morphological events that is synchronized by the activation and deactivation of specific genes (Thompson *et al.*, 1992; Wyllie, 1985). In the case of pesticides, the selective cytotoxic action against the infective agent, including an insect, bacterial or fungal pathogen, is typically analyzed.

5 An efficacious means for *in vitro* assaying of cytotoxicity comprises the systematic exposure of a panel of cells to selected compositions. For example, in the case of cancer, many tumor cell lines are available for implementing assays, including human ovarian, leukemic, breast, prostate, melanoma and renal cancer cells.

10 *In vitro* determinations of the efficacy of a compound in killing tumor cells may be achieved, for example, by assays of the expression and induction of various genes involved in cell-cycle arrest (p21, p27; inhibitors of cyclin dependent kinases) and apoptosis (bcl-2, bcl-x<sub>L</sub> and bax). To carry out this assay, cells are treated with the test compound, lysed, the proteins isolated, and then resolved on SDS-PAGE gels and the gel-bound proteins transferred to nitrocellulose membranes. The membranes are first probed with the primary antibodies (*e.g.*,  
15 antibodies to p21, p27, bax, bcl-2 and bcl-x<sub>L</sub>, *etc.*) and then detected with diluted horseradish peroxidase conjugated secondary antibodies, and the membrane exposed to ECL detection reagent followed by visualization on ECL-photographic film. Through analysis of the relative proportion of the proteins, estimates may be made regarding the percent of cells in a given stage, for example, the G0/G1 phase, S phase or G2/M phase.

## 20 VI. Examples

The following examples are included to demonstrate preferred embodiments of the invention. It should be appreciated by those of skill in the art that the techniques disclosed in the examples which follow represent techniques discovered by the inventor to function well in the  
25 practice of the invention, and thus can be considered to constitute preferred modes for its practice. However, those of skill in the art should, in light of the present disclosure, appreciate that many changes can be made in the specific embodiments which are disclosed and still obtain a like or similar result without departing from the spirit and scope of the invention.

## EXAMPLE 1

### Inhibition of Antibiotic Resistant Bacteria With Ectophosphatase Inhibitors

#### A. Summary of Protocol and Results

The purpose of this study was to evaluate various ectophosphatase inhibitor compounds for any potentiating effect or resistance reversal with methicillin resistant *Staphylococcus aureus* (MRSA). Two strains of *Staphylococcus aureus* were obtained from the American Type Culture Collection (ATCC). Those obtained were a previously characterized methicillin resistant strain (# 43300) and a previously characterized methicillin sensitive strain (# 29213) to serve as a control. Strains were received as lyophilized pellets and were rehydrated according to the ATCC Product Information Sheet using Trypticase Soy Broth.

Mueller-Hinton agar plates were prepared containing 1 of 6 inhibitor compounds investigated. The compounds were dissolved in DMSO at concentrations of 20 mg/ml. 25 µl of this stock solution was added to 25 mls of media just prior to cooling to solidification to produce plates containing 20 µg/ml of inhibitor compound. Control plates containing 25 µl DMSO only were also prepared in the same fashion.

For each of the two strains, 5 isolated colonies were picked from overnight culture plates and used to inoculate a 0.85% NaCl solution. The turbidity of each culture was adjusted using 0.85% NaCl until the turbidity of each matched a 0.5 McFarland turbidity standard. Each strain was swabbed onto control plates. The MRSA strain was swabbed also onto the inhibitor plates. Plates were allowed to dry for 5 minutes. A disk containing 5 µg of methicillin (obtained for the purpose of susceptibility testing from Bioanalyse Co., Ltd.) was placed onto the surface of all plates. Plates were incubated at 37°C.

Plates were read after 24 hours. It was noticed at this time that one plate, containing inhibitor compound NGXT1914 (Formula XV), was clear--there was no bacterial growth at all. All other plates had confluent growth except at the zone of inhibition of the methicillin disk.

Protocols for the studies were according to NCCLS guidelines (M2-A7, M100-S11) for antimicrobial susceptibility testing. Methodology for the serum bactericidal test was according to (Tentative Guideline) NCCLS M21-T, 1992. Methods for determining bactericidal activity of antimicrobial agents was according to (Tentative Guideline) NCCLS M26-T.1992. Methods for dilution antimicrobial susceptibility tests for bacteria that grow aerobically. 3rd ed. NCCLS

M7-A3.1993. Protocols for evaluating dehydrated Mueller-Hinton agar were according to NCCLS M6-A, 1996. Performance standards for antimicrobial susceptibility testing were according to NCCLS M100-S8, 1998. The screening test for Oxacillin-resistant Staphylococci was according to NCCLS M7-A4. Performance standards for antimicrobial disk and dilution susceptibility tests for bacteria isolated from animals was according to (Approved Standard) NCCLS M31-A. Performance standards for antimicrobial susceptibility testing were according to NCCLS M100-S8.1998. Screening test for Oxacillin-resistant Staphylococci was according to NCCLS M7-A4 Susceptibility test panels.

#### B. Confirmation of results

In order to ascertain whether the result with inhibitor NGXT1914 was artifactual, both MRSA and MSSA were tested on Mueller-Hinton agar plates containing varying concentrations of NGXT1914. First, plates were prepared as above with the following concentrations of inhibitor compound: 0 µg/ml (DMSO controls), 1 µg/ml, 5 µg/ml, 10 µg/ml, and 25 µg/ml. Inhibitor concentrations were prepared such that all plates contained 25 µl total DMSO. For each of the two strains, 5 isolated colonies were picked from fresh overnight culture plates and used to inoculate a 0.85% NaCl solution. The turbidity of each culture was adjusted using 0.85% NaCl until the turbidity of each matched a 0.5 McFarland turbidity standard. Both strains were each swabbed onto both control and inhibitor plates. Plates were allowed to dry for 5 minutes and were placed into the incubator. Plates were read after 24 hours (12/7/01). The results were as follows:

Concentration (µg/ml NGXT1914)	Result
25 µg/ml	No growth at all for either strain
10 µg/ml	No growth at all for MRSA strain. Some small isolated colonies on the MSSA plate.
5 µg/ml	Only a few small colonies on the MRSA plate. Confluent growth on the MSSA plate.
1 µg/ml	Confluent growth on both plates.
Controls	Confluent growth on both plates.

### C. Conclusions

Inhibitor NGXT 1914 inhibits growth of both resistant and sensitive *Staph* strains, however it is more effective against the methicillin resistant strain. This compound was tested with other cell types (mammalian cell lines, plants (*Arabidopsis thaliana*) yeast, *Pseudomonas* 5 *aeruginosa*) and has not inhibited growth of any cell line or organism at the concentrations tested. Since NGXT1914 is an ectophosphatase inhibitor, it is possible that *Staph*, particularly the MRSA, is dependent on a phosphatase that is an ideal substrate for NGXT1914. The results obtained indicated that NGXT1914 was more effective against MRSA versus MSSA than previously identified compounds.

### EXAMPLE 2

#### Inhibition of Chemotherapy-Resistant Tumor Cells With An Ectophosphatase Inhibitor

15 In order to determine the effect of ectophosphatase inhibitors on tumor cells resistant to a chemotherapeutic agent, 2 breast cancer tumor cell lines were tested, a vinblastine resistant line (SW-13Vb003) and its vinblastine sensitive parent line, SW-13. A standard 4 day incubation at 37 °C and 5 % CO<sub>2</sub> was used. IC<sub>50</sub> tests (MTT) were done using standard methodology in 96 well plate format with inhibitor concentrations ranging from 0-90 µg/ml (DMEM media). 20 Results showed that 3 of the inhibitor compounds tested, NGXT194 (Formula VI), NGXT196 (Formula VIII), and NGXT1915 (Formula X), produced lower IC<sub>50</sub> values with the resistant cell line than with the sensitive line. For NGXT194, SW-13 was sensitive at 20 µg/ml, whereas the vinblastine resistant line SW-13Vb003 was sensitive at 10 µg/ml. For NGXT196, SW-13 was sensitive at 30 µg/ml, whereas the vinblastine resistant line SW-13Vb003 was sensitive at 10 25 µg/ml. For NGXT1915, SW-13 was sensitive at 50 µg/ml, whereas the vinblastine resistant line SW-13Vb003 was sensitive at 20 µg/ml.

Based on the inventors previous findings concerning the role of ectophosphatases in drug resistance, it seems likely that many resistant cells have upregulated phosphatases and that inhibiting a phosphatase critical to maintaining these cells could result in cell death. One 30 hypothesis is that once these phosphatase enzymes are upregulated or are used in drug resistance their function becomes one that is vital to the cell. Since this phenomenon has been seen now in



a bacterial resistance model it might be expected that the ectophosphatase inhibiting compounds could preferentially kill other types of resistant cells or act as biocides to certain cells.

### EXAMPLE 3

#### Over-Expression of Ectophosphatase Does Not Increase the Cellular Uptake of Adenosine

##### A. Materials and Methods

Transgenic Plant Construction: psNTP9 (*Pisum Sativum* apyrase, GenBank accession #Z32743) was subcloned as a Sall to Xbal fragment into pKYLX71 (Scharl *et al.*, 1987, *supra.*). This plasmid was transformed into *A. tumefaciens* GV3101 [pMP90] pKYLX71 (Koncz and Shell, 1986), which was used to infect root call from Ws ecotype *Arabidopsis thaliana* under kanamycin selection (Valvekens *et al.*, 1992). Four individual lines, obtained from separate calli, were propagated to the third generation (T3).

Subcellular Apyrase Distribution in Pea: Etiolated pea plumules served as the tissue source for nuclei and cytoplasm isolation as described by Chen and Roux (*Plant Physiol.* 81:609-612 (1986)). Plasma membrane was prepared from 30 g of pea root tissue (Zhu Mei Jun and Chen Jia; 1995, *Acta Botanica Sinica* 37:942-949). Western analysis was performed on 15-30 pg of protein from cytoplasm, plasma membrane and nuclei using a polyclonal anti-apyrase antibody raised against the purified pea protein (Tong *et al.*, 1993). To determine the orientation of the pea apyrase in the pea plasma membrane, outside-out vesicles were prepared and the accessibility of the enzyme was determined by selective trypsin proteolysis, or membrane shaving, followed by activity assays and western blotting.

Phosphate uptake experiments and growth assays: In all experiments the growth media did not contain sugar, and plants were grown in sterile culture at 22°C under 150-200 pE of continuous light. Unless otherwise noted, a standard 0.8% agar medium (Becton Dickenson, Cockeysville, Md.) containing 100 µM phosphate was used for uptake assays (Somerville *et al.*, 1982). Plants used for the phosphate uptake experiments were grown singly in 1 ml of the standard agar medium for 15 days prior to the experiment. On the day of the experiment, 10 µCi<sup>32</sup>P was applied to the side of the culture dish and allowed to diffuse through the agar. The lids of 95 mm x 15 mm tissue' culture dishes (Fisher, Pittsburgh, Pa.) were removed to facilitate transpiration.

After 18 hours, the plants were removed from the medium. The aerial portions of the plant not in contact with the agar were weighed and counted by liquid scintillation. For each plant the entire root system was carefully pulled from the agar and washed in ice cold water prior to scintillation counting. To measure the transport of the products of ATP hydrolysis by the transgenic plants overexpressing apyrase and by wild-type plants, [2,8<sup>3</sup>H]ATP, [ $\alpha$ -<sup>32</sup>P]ATP, and [ $\gamma$ -<sup>32</sup>P]ATP (Amersham) were fed to 15-day-old plants in separate treatments. All treatments were analyzed for significance in a T-test (n>4-6 for all groups, \*P<0.05, error bars = s.e.m.).

## B. Results

Detection of the pea apyrase in nuclei and in purified plasma membrane: By immunoblot assay, the pea apyrase was found to be associated with nuclei and with purified plasma membranes but not with the cytoplasm (FIG. 1A). The contents of the lanes in FIG. 1A are as follows: Lane 1, cytoplasm; Lane 2, purified plasma membrane; Lane 3, purified nuclei; and Lane 4, pre-immune control of nuclei. Protease treatment destroyed both apyrase activity and antigenicity in outside-out plasma membrane vesicles. After trypsin treatment, the exterior face of the vesicle showed 30% of the ectophosphatase activity of the untreated sample. Endo-phosphatase activities were retained after trypsin treatment, indicating that the digest occurred exclusively on the exterior face of the membrane. These data indicated that the ectoapyrase was in fact being expressed in the extracellular matrix (ECM).

Enhanced Growth of Plants Over-Expressing Apyrase: Three of the four transgenic plant lines constitutively expressed psNTP9 under the control of the cauliflower mosaic virus 35S promoter and over an 18 hour period showed two to five times as much phosphate accumulation in shoots as wild type (FIG. 1B); Top, the total phosphate accumulated in the shoots of three independent transformants in an 18 hour <sup>32</sup>p uptake assay at 2 mM phosphate; Bottom, a corresponding immunoblot performed on equal amounts of protein isolated from the ECM of three week-old wild-type *Arabidopsis thaliana* and the psNTP9 transgenics. Apyrase expressing plants also showed four times as much phosphatase activity in the extracellular matrix as the wild-type (FIG. 1 C). (Note, OE 1 in the FIG. stands for over-expression 1 transgenic line).

Transgenic plants preferentially transport the gamma phosphate of ATP: In order to address whether over-expression of ectoapyrase was stimulating the adenosine salvage pathway, the intracellular uptake of adenosine was measured both in the presence and absence of the overexpression of apyrase. The inability of apyrase to translocate either extracellular AMP or

adenosine was demonstrated by the low level of radiolabel accumulated in the transgenic plants fed [2,8<sup>3</sup>H]ATP and [a<sup>32</sup>p]ATP (FIG. 2). The complete dephosphorylation of [2,8<sup>3</sup>H]ATP would result in a radiolabelled adenosine molecule while the complete dephosphorylation of [a<sup>32</sup>P]ATP would result in a non-labeled adenosine label. FIG. 2A illustrates that plants overexpressing apyrase did not translocate radiolabelled adenosine (or byproducts of the dephosphorylation of [2,8<sup>3</sup>H]ATP) any more efficiently than plants not overexpressing apyrase (wild-type plants). FIG. 2B illustrates that plants overexpressing apyrase did not translocate AMP (or the byproducts of the dephosphorylated [a<sup>32</sup>P]ATP) any more efficiently than wildtype plants. In comparison, feeding experiments where the  $\gamma$  phosphate was labeled, the transgenics accumulated three times the amount of labeled phosphate as the wild-type (FIG. 2C). These data show that the over-expression of apyrase does not induce an increase in the uptake of adenosine and therefore its over-expression does not act to stimulate the adenosine salvage pathway.

#### EXAMPLE 4

##### EctoPhosphatase is Involved in Drug Resistance in Yeast and Plants

###### A. Materials and Methods

Expression of AtPGP-1 in yeast: The AtPGP-1 cDNA (*Arabidopsis thaliana* MDR gene, accession #X61370) was subcloned into pVT101 downstream of the ADH promoter to create the AtPGP-1/pVT101 construct. AtPGP-1/pVT101 and pVT101 were transformed into *Saccharomyces cerevisiae* INVSCI (genotype: MATa, *his3-ΔI*, *leu2*, *trp1-289*, *ura3-52*) and YMR4 (genotype: *MATa his3-11,15*, *leu2-3, 112ura3Δ5*, *can Res pho5, 3: : ura3ΔI*) by a PEG lithium acetate procedure (Eble, 1992) and selected on uracil dropout medium.

Yeast Growth: Yeast were grown at 30°C under conditions of constant selection for uracil auxotrophy. YNB (Bio101, Vista, CA) supplemented with CSM (uracil dropout) and 2% glucose was used to grow strains having pVT101 constructs. Cycloheximide (Sigma Chemical, St. Louis, MO.) was added to liquid media or spread on solid media to achieve a final concentration of 500 ng/ml. Nigenm (Sigma Chemical, St. Louis, MO.) was added to liquid media or spread on solid media to achieve a final concentration of 25 μg/ml. Yeast strains used in cycloheximide selection assays were always propagated in the presence of the cycloheximide on plates and then streaked onto new plates containing drug or no drug, such that induced

resistance existed in each strain at the time of the start of the assay. For selection assays on plates, single colonies were streaked; for selection in liquid media 0.01 ml of saturated culture was added to fresh media containing the drug. The plates shown in figures were grown for 3-5 days before photographs were taken. Yeast selection assays in liquid media were quantitated by turbidity as measured by absorbance at OD<sub>600</sub>.

Expression of apyrase and AtPGP-1 in plants: The expression of apyrase in plants is as described above in Example 3. Similar methods were employed to express AtPGP-1 in *Arabidopsis thaliana* plants with the following modifications. The AtPGP-1 coding region was subcloned into a pBIN vector lacking the GUS gene as described in Sidler *et al.* (1998). This plasmid was then transformed into *A. tumefaciens* as described above, which was used to infect root calli to produce transgenic plants expressing AtPGP-1.

Plant growth: *Arabidopsis thaliana* seeds were sown in a solid germination media containing MS salt, 2% sucrose, 0.8% agar, and vitamins (Valvekens *et al.*, 1992). For selection assays, cycloheximide was spread on the media to achieve a final concentration of 250 ng/ml. Plant growth was measured by germination percentage after 6-30 days.

## B. Results

Effect of over-expression of AtPGP-1 in yeast: When a yeast mutant, YNIR4, which is deficient in two major extracellular phosphatases and tends to accumulate ATP extracellularly, was grown in a potent cellular toxin, cycloheximide, it did not grow whereas a wild-type yeast strain, INVSCI, did grow in the presence of cycloheximide (FIG. 3A). Surprisingly, expression of the plant multidrug resistance (MDR) gene, AtPGP-1, enabled the yeast mutant to grow in the toxin (FIG. 3B and FIG. 5A). The presence of AtPGP-1 in the wild-type yeast did not have any effect when grown in the presence of cycloheximide (FIG. 3B). The same result was obtained when the yeast strains were cultured in nigericin (FIG. 3C, 3D, FIG. 5B, 5C). In FIG. 3C and 3D, starting from the top of the dish clockwise, the cells are as follows: INVSCI (wild-type) overexpressing AtPGP-1, YNM4 containing the vector alone, YMR4 overexpressing AtPGP-1, and INVSCI containing the vector alone. When grown without drug, all the cells grow (FIG. 3C). However, when grown in drug, only the YMR4 containing vector alone shows reduced growth. The survival of the AtPGP-1 transformed strains was due to the ability of the NIDR1 channel to efflux the toxin, hence lowering the actual cellular concentration of the poison cycloheximide. The sensitivity of the untransformed mutant to the drug is likely due to a loss of

Effect of over-expression of AtPGP-1 in plants: The over-expression of AtPGP-1 was able to confer resistance to cycloheximide in plants (FIG. 4A and 6) and to the cytokinin, N<sub>6</sub>-(2isopentenyl) adenine (2iP) (FIG. 4B). These results had not been observed previously and in fact, the prior art actually teaches away from this finding suggesting that over-expression of plant AtPGP-1 is not involved in drug resistance (Sidler. *et al.*, 1998). Therefore, this result was particularly unexpected in plants. Additionally, since *Arabidopsis* plants overexpressing AtPGP-1 are able to grow in both cycloheximide and cytokinin, this suggests that the conference of drug resistance by AtPGP-1 is likely to be seen with other chemicals as well and is not an isolated phenomenon.

Effect of over-expression of apyrase on drug resistance in plants: Another unexpected result was obtained when the plant apyrase gene was over-expressed in plants. Over-expression of apyrase in plants resulted in the conferrence of resistance to cycloheximide (FIG. 4A and 6). The same result was obtained when the plants were grown in the presence of a cytokinin, N<sub>6</sub>-(2isopentenyl) adenine (FIG. 4B). In fact, over-expression of apyrase is surprisingly able to raise the germination rate above the level obtained by the over-expression of the MDR gene AtPGP-1 (FIG. 4A, 4B and 6). Just as under-expression of phosphatase activity in a yeast mutant lacking two potent extracellular phosphatases diminished its resistance to cycloheximide (FIG. 3A), over-expression of a powerful extracellular ATP phosphatase in plants bolstered resistance. The fact that higher resistance was found in plants genetically manipulated only with respect to phosphatase over-expression and not MDR1, indicates that there likely exists other ATP-symporters used in detoxification in addition to MDR1. Minimally, the stronger ATP gradient set up by apyrase in the transgenic plants affects the kinetics of the wild-type MDR1.

25 EXAMPLE 5

### ATP Efflux in Yeast and Plants Overexpressing AtPGP-1

ATP collection: Yeast cells used in the luciferase assays were grown for two days and then transferred to Lsh media at the time of the assay. From this time forward, the cells were kept at room temperature on a rotator. Every hour a 1 ml aliquot was taken, the cells in the

aliquot were counted on a hemocytometer, a methylene blue viability assay was performed (Boyum and Guidotti, 1997), the cells were centrifuged, and the supernatant was stored in liquid nitrogen until all the aliquots were collected. For luciferase assays involving plants, *Arabidopsis thaliana* plants were grown in sterile culture at 22°C under 150-200 pE of continuous light for at least 15 days. Foliar ATP was collected by placing a single 30 µl drop of luciferase buffer (Analytical Luminescence Laboratory, Cockeysville, Md.) on a leaf and, without making direct physical contact with the plant, the droplet was immediately collected and snap frozen. For each leaf, the area was approximated as an integrated area of a 2-D image of the leaf using NIH 1.52 software (Shareware, NIH).

Luminometry: Samples were reconstituted to a 100 µl final volume in Firelight™ buffer (Analytical Luminescence Laboratory, Cockeysville, MD). After the buffer was added, all samples were kept on ice. ATP standards were reconstituted in 100 µl of Firelight™ buffer and the standards and sample were loaded into a 96-well plate and read on an automated Dynex Technologies Model MLX luminometer (Dynex Technologies, Chantilly, Va.). Samples were processed with the addition of 50 µl of Firelight™ enzyme (Analytical Luminescence Laboratory, Cockeysville, MD) followed by a reading delay of 1.0 second and an integration time of 10 seconds. Output was taken as an average for the integration time and then averaged for multiple samples. The sample handling time was less than 2 hours.

Pulse Chase experiments: Yeast were grown to saturation in liquid medium, as described above, centrifuged, and resuspended in fresh medium containing 1 µCi/ml <sup>3</sup>H-adenosine (Amersham, Arlington Heights, IL). The cells were rotated at room temperature for 20 minutes to allow adenosine uptake. After 20 minutes the cells were centrifuged. The pellet was washed twice in ice cold medium, resuspended in culture medium at room temperature, divided equally between five types (five per cell line), and placed on a rotator. Every ten minutes a separate tube from each cell line was centrifuged and the pellet and supernatant were placed in separate scintillation vials. The efflux activity was expressed as the ratio of counts in the supernatant to counts in the pellet.

## B. Results

The ATP effluxed by the plant MDR1, AtPGP-1, over-expressed in yeast: In wild-type cells there is a steady-state level of ATP in the extracellular fluid, which is to say that the ATP outside the cells is rapidly degraded by phosphatases and does not accumulate over time (FIG.

7). However, the expression of the AtPGP-1 doubled this steady-state level (FIG. 8). If the yeast mutant, YMR4, which is deficient in extracellular phosphatase activity, is analyzed, there was a noticeable accumulation of ATP in the extracellular fluid compared to a control mutant transformed with empty plasmid pVT101 (FIG. 9). In addition to ATP measurements based on luminometry performed on a kinetic time-scale of hours, an earlier differential ATP efflux in MDRI expressing cells by pulse chase experiments was demonstrated (FIG. 10). Furthermore, *Arabidopsis thaliana* plants from two independently transformed lines, that constitutively express the AtPGP-1 protein, showed a significant accumulation of ATP on their leaf surfaces (FIG. 11). Taken together, these data demonstrate the absolute ability of plant MDRI, AtPGP1, to transport ATP from inside the cell to the outside. Moreover, these data show that ATP efflux channels and phosphatases both have roles in the steady-state level of ATP outside of the cell. This is the first demonstration of the importance of extracellular ATP steady-state levels, and the importance of an ATP gradient across biological membranes in the modulation of drug resistance.

## EXAMPLE 6

### A Two-Component System is Found in *Arabidopsis* Plants

#### A. Materials and Methods

Plant Growth: *Arabidopsis* seeds were sown in a solid germination media containing MS salts (Sigma Chemical, St. Louis, Mo.), 2% sucrose, 0.8% agar, and vitamins (Valvekens *et al.*, 1992). For selection assays, one of the following, or a combination of both, was added to media (cooled to less than 50°C before adding) immediately prior to pouring into plates: cycloheximide at a final concentration of 500 ng/ml;  $\alpha,\beta$ -methyleneadenosine 5'-diphosphate at a final concentration of 1mM. Plant growth was measured by germination percentage after 10-20 days.

All other materials and methods were discussed above in Example 4.

#### B. Results

Effects of phosphatase inhibitor on plants overexpressing AtPGP-1: FIG. 12 shows that when wild-type and AtPGP-1 overexpressing (MDR OE) *Arabidopsis thaliana* plants were either treated with nothing (lane 1), cycloheximide (lane 2),  $\alpha,\beta$ -methyleneadenosine 5'-diphosphate (phosphatase inhibitor) (lane 3), or cycloheximide and phosphatase inhibitor (lane 4), both the wild-type and the AtPGP-1 overexpressing plants were affected similarly by the presence of

phosphatase inhibitor. While the AtPGP-1 overexpressing plants grew significantly better in the presence of cycloheximide alone with a 50% germination rate for the AtPGP-1 overexpressing plants and a 2% germination rate for the wild-type plants, similar germination rates were seen for both the AtPGP-1 overexpressing and wild-type plants in the presence of either phosphatase inhibitor alone (83% and 90% germination respectively) or cycloheximide plus phosphatase inhibitor (no germination at all). The addition of phosphatase inhibitor surprisingly destroys the ability of the AtPGP-expressing plants to grow in the presence of cycloheximide. These data suggest that phosphatases are involved in the conference of drug resistance in plants and that there is a two-component system similar to that demonstrated in yeast in Example 4 and 5 above in which an MDR-like protein and an ATP-gradient-maintaining ectophosphatase are important in modulating drug resistance.

## EXAMPLE 7

### The ATP Gradient Directly Effects Drug Resistance in Cells

#### A. Materials and Methods

Cell lines: Cell lines were the same as those described above in Example 4 and 5. YMR4 MDRI is the phosphatase mutant yeast strain overexpressing AtPGP-1; YMR4 pVT101 contains vector alone; INVSC MDRI is the wild-type yeast strain overexpressing AtPGP-1; and INVSC pVT101 contains vector alone.

Selection in drug: To create drug resistant yeast strains, all four cell lines were grown up in the presence of 500 ng/ml of cycloheximide, and transferred to other cycloheximide containing plates after a period of four to six days. This transfer of cell lines and subculturing continued such that the yeast cells grew in the presence of cycloheximide for a period of at least a month. Cells cultured in media alone: To create cell lines that had not been preselected for their ability to grow in drug, yeast strains were grown on plates containing YNB (Bio101, Vista, CA) without uracil (-URA) to maintain the presence of the vector (which supplies URA) without any drugs added.

Growth of cells in suspension for ATP and drug selection experiments: Cells were transferred into 5 ml YNB -URA liquid media for turbidity measurements. All cell lines (both non-drug selected and drug-selected) were grown in media with the addition of either nothing, 500 ng/ml cycloheximide, 100 mM ATP, or 500 ng/ml cycloheximide and 100 mM ATP. Turbidity readings were taken after 48 hours.



Growth of cell lines in suspension for salvage pathway experiments: All cell lines were grown in liquid media either containing drug (for the drug selected lines) or not containing drug (for the non-drug selected lines). When the cultures reached a turbidity of 1.00 as measured at a wavelength of 600 in a spectrophotometer ( $OD_{600} = 1.00$ ), 10  $\mu$ l of each culture was then removed and placed in either media with nothing added, 3 mM potassium phosphate; 3 mM adenosine; 9 mM potassium phosphate and 3 mM adenosine (for controls); potassium phosphate and cycloheximide; adenosine and cycloheximide; adenosine, cycloheximide, and potassium phosphate. Cell cultures were further grown for 72 hours, and their turbidity was determined by  $OD_{600}$  readings on a spectrophotometer.

Growth of cell lines for nigericin experiments: Drug selected lines were removed from cycloheximide containing plates and placed in 5 ml liquid media containing 5 ng/ml cycloheximide. Cell cultures were allowed to grow until they reached an  $OD_{600}$  reading of 1.00, and then 10  $\mu$ l from each culture was removed and transferred to culture tubes containing 5 ml of liquid media and 25 pg/ml nigericin.  $OD_{600}$  readings were recorded daily for a period of up to 72 hours to determine growth.

## **B. Results**

An ATP gradient is critical in MDR: The importance of the ATP gradient in MDR in yeast cells was demonstrated by showing that the growth of cells which were previously grown in drug and had developed resistance to the drug, were not able to grow in high levels of ATP unless they were overexpressing AtPGP-1 (FIG. 13). Cells which had not been previously selected in drug were able to grow in the presence of high levels of ATP (FIG. 13). These data emphasize that the loss of an ATP gradient in previously resistant cell lines abolishes resistance. This result is new to the understanding of MDR and has led to vast insight into the understanding of the mechanism by which MDR-ABC transporters confer resistance to cells and to methods to modulate such resistance. Moreover, when cells were grown in high levels of ATP and drug (cycloheximide), even the cell lines which had previously showed resistance to drug were unable to grow in the presence of drug and ATP. These data indicate that when the ATP gradient across biological membranes is destroyed (by the presence of high extracellular levels of ATP), efflux of drugs cannot be achieved and therefore, drug resistance is abolished. In summary, the multidrug resistance channel is not functional without an ATP gradient.

The drug resistance is not due to an adenosine salvage pathway: In order to address whether the involvement of a nucleotide salvage pathway was responsible for the results of the present invention, yeast cells were cultured in the presence of extracellular adenosine and extracellular phosphate. The acid phosphatase yeast mutant, YMR4, was selected because its decreased ectophosphatase activity makes it an ideal candidate for studying the effect of extracellular nucleotides on growth. If an adenosine salvage pathway were involved, then the presence of extracellular adenosine or possibly phosphate should help cells recoup the intracellular ATP losses due to ATP/drug efflux and should help cells grow in the presence of drug whether or not the cells were overexpressing AtPGP-1. In contrast, however, the addition of adenosine or phosphate to the media did not enhance resistance to the cells (FIG. 14). In fact, cells overexpressing AtPGP-1 grew best in drug alone, with the addition of adenosine and/or phosphate being slightly inhibitory. Furthermore, cells which did not express AtPGP-1 were unable to grow in drug regardless of the presence of adenosine and/or phosphate. These data suggest that an adenosine salvage pathway is not the principal mechanism at work in the present invention.

## EXAMPLE 8

### High Throughput Screen for Isolating Apyrase Inhibitors

#### A. Materials and Methods

Small Molecule Library: A small molecule library (DIVERSet format F), which was specifically constructed to maximize structural diversity in a relatively small library (9600 compounds), was obtained from ChemBridge Corporation (San Diego, CA). The small molecules (supplied in 0.1 mg dehydrated aliquots) were dissolved in DMSO, transferred to a 96 well plate, and tested for their ability to inhibit apyrase activity.

The assay: A stringent screen to test the ability of small molecules to disrupt the ATPase activity of the apyrase enzyme was developed based on phosphate-molybdate complexation. The assay was a modification of a phospholipase assay developed by Hergenrother *et al.* (1997): Under normal conditions, the apyrase enzyme liberates phosphate from ATP present in the reaction. The liberated phosphate quickly forms a complex upon addition of a small amount of acidified molybdate and ascorbate allowing for the production of a very dark blue color (the less phosphate liberated, the less blue color). Control reactions were performed with heat inactivated apyrase enzyme. Color intensity was detected on an Alpha Imager 2000 with AlphaEase™

software (Alpha Innotech, San Leandro, CA). Color changes were also evident by the naked eye. A Biomek 2000 robot (Beckman, Fullerton, CA) was used for screening the 9600 samples.

To each well of the 96 well plates containing a small molecule from the library, 100 pI of reaction buffer (60 mM HEPES, 3 mM MgCl<sub>2</sub>, 3 mM CaCl<sub>2</sub>, 3 mM ATP pH 7.0) was added.  
5 The apyrase (potato apyrase grade VI, Sigma Chemical, St. Louis, MO) enzyme (0.1 units) was added in a 5 pI volume and the reaction was allowed to proceed at room temperature for 60 minutes.

Three buffers were used to visualize activity: Buffer A: 2% Ammonium molybdate in water Buffer B: 1 I% Ascorbic acid in 37.5% aqueous TCA. Buffer C: 2% trisodium citrate, 2%  
10 acetic acid.

Immediately before developing the assay, buffers A and B were mixed in a 1:1 \_5 ratio. 50 pl of A:B was added to each well. The 96 well plate was then vibrated on a table surface to mix the solution. The deep blue color developed after approximately 2 minutes. After 2 minutes, 50 p.l of buffer C was added to each well and the blue color became darker, increasing  
15 the sensitivity of the assay. The color intensified for up to one hour with no accompanying color change in the control wells containing heat inactivated apyrase enzyme. The color intensity for a single plate was measured on an Alpha Imager 2000 with AlphaEase™ software (Alpha Innotech, San Leandro, CA).

## **B. Results:**

20 Nineteen positives were identified from the 9600 compound DIVERSet library. Dose response assays revealed that fourteen showed weak inhibition, two showed medium inhibition (Formulas N and V), and three showed relatively strong inhibition (Formulas I, II and III).

\* \* \*

25 All of the compositions and methods disclosed and claimed herein can be made and executed without undue experimentation in light of the present disclosure. While the compositions and methods of this invention have been described in terms of preferred embodiments, it will be apparent to those of skill in the art that variations may be applied to the compositions and methods and in the steps or in the sequence of steps of the method described

herein without departing from the concept, spirit and scope of the invention. More specifically, it will be apparent that certain agents which are both chemically and physiologically related may be substituted for the agents described herein while the same or similar results would be achieved. All such similar substitutes and modifications apparent to those skilled in the art are  
5 deemed to be within the spirit, scope and concept of the invention as defined by the appended claims.

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The following references, to the extent that they provide exemplary procedural or other details supplementary to those set forth herein, are specifically incorporated herein by reference.

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